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PROJECTIVE METHODS: THEIR ORIGINS, THEORY, AND APPLICATION IN PERSONALITY RESEARCH

HELEN SARGENT

Northwestern University

Projective methods were in use prior to 1939, but were not designated as such until after that date which marks the introduction of the term in an article by L. K. Frank (5). Since then, the concept has been specifically employed in an increasing number of titles in the *Psychological Abstracts*, and has become common usage in the literature of personality research. A lively experimental attack utilizing the projective approach has grown up in child psychology, psychopathology, and personality.

Fairly representative of definitions usually offered is the following:

A projective method for the study of personality involves the presentation of a stimulus situation designed or chosen because it will mean to the subject not what the experimenter has arbitrarily decided it should mean (as in most psychological experiments using standardized stimuli in order to be "objective") but rather whatever it must mean to the personality who gives it, or imposes upon it, his private, idiosyncratic meaning and organization (5, p. 403).

These methods which Frank described, and for which he furnished a rationale as well as a name, are in no sense a new discovery, although their current popularity is in part derived from a research atmosphere peculiarly suited to their rapid growth in the past five years. The very wording of the above definition implies a controversy: it presents projective techniques not only as an addition to our present stock of instruments; it also implies that they are set up in opposition to something. In order to understand either their promise, or the obstacles which stand in the way of their unqualified welcome in scientific circles, it will be necessary to examine their historical roots as well as the contemporary theoretical climate in which they flourish; to survey the problems to which they have been applied and the results obtained; and to study certain methodological difficulties which beset them. Furthermore, it will be necessary to hold a patient hearing of somewhat repetitive controversial views.

BACKGROUND

The developing family of projective methods might be regarded as the legitimate children of two parents: a brilliant and daring mother, psychiatry, and an equally intelligent but more conservative father, academic psychology. The five-year-old offspring partake of the characteristics of both forebears; they have a promising future, but have not yet overcome insecurity engendered by the fact that each parent is inclined to berate them for faults presumably inherited from the other.

Putting metaphor aside, we may discern in the context which surrounds projective techniques, three major theoretical trends which have contributed to a general point of view, and four lines of research more or less closely related to projective experimentation. The most important theoretical influences include psychoanalysis, *global theory*, and certain developments in twentieth century general science. Relevant research includes studies in imagination and phantasy, the word-association method, investigations of language, and the development of methods for the use and interpretation of *personal documents*.

Theoretical climate

1. *Psychoanalysis.* The term *projection* was first used by Freud to describe one of the unconscious minor mechanisms of conflict solution (230). The ego, unable to accept in itself certain thoughts, wishes, or characteristics, attributes these to environmental objects or to persons (222, p. 75). Sears, quoting a somewhat elaborate definition by Healy, Bronner and Bowers, which expresses a similar connotation, prefers to withdraw the term from its *metapsychological setting* and to define it as follows:

A wish, attitude, or habit-hierarchy which is not compatible with other attitudes or habits of an individual may be attributed by that individual to other persons rather than to himself, providing he lacks insight into the fact that he himself possesses the trait in question. This process of attribution is unconscious, i.e., the subject does not give any verbal evidence that he knows his perception is false (19, p. 561).

Sears has also called attention to a distinction between the above use of the term projection as applied to the basic paranoid mechanism, and its usage with reference to projective techniques. He states that "in the latter case the implication is that the motivational and organizational properties of a personality influence the perceptual and judgmental processes" (262, p. 121). Important as it is to differentiate these two connotations, there appears to be reason rather than confusion in the dual application of the word. The alleged defensive reactions of the ego are subject to observation in the selective effect upon perception, and in diverse expressive responses; conversely the motivations which are assumed to be operative are subject to explanation in terms of ego defense. It may be said that the noun *projection* describes one type of defense, and that the adjective *projective* applies more broadly to the observable effects of this and other psychic processes, and to the methods used to elicit and study them.

That the mechanism of projection is one of the most readily understood and accepted of any in the Freudian scheme is demonstrated by its easy translation into the idiom of a child, or of a schizophrenic. Feigenbaum reports that a little girl to whom a paranoid acquaintance had been described as "hating people" replied promptly: "I know why he hates them! It's like when Mother wants to go to the toilet, she asks me if I have to" (4, p. 305). A schizophrenic, one of Balken's subjects, remarked: "If I refuse to recognize it, it is not me" (144, p. 249). The fields of art and literature also provide an almost unexplored territory for the study of projection as a psychological phenomena. In fiction and in poetry it is possible to trace not only the projections of the writer, but to discover subtle techniques used by authors (and by musicians and artists as well) to provide a medium in which others may project and enjoy release. Dean Addison Hibbard of Northwestern University has for a number of years assigned items from the personal columns in English newspapers to students as a

starting point for compositions, and reports that he has regularly noted the inclusion of personally significant material.

The debt of projective theory is not confined to the term, nor to the description of mechanism. It was Freud who first made systematic inquiry into hidden motivations and into the genetic determinants of mental life, and it is exactly these that the projective methods seek to uncover. The psychoanalytic methods for interpreting behavior, both verbal and motor, in terms of their symbolic rather than their obvious meaning; Freud's emphasis upon the unconscious; and the distinctions he drew between latent and manifest dream content, have had a profound influence upon the significance attached to projective productions. White, writing of Freud's method of dream interpretation, describes the dream as "a natural projective method capable of revealing much valuable information if only the signs can be directly read" (23, p. 218). Play techniques, although used by analysts only as secondary tools, had their origin in orthodox child psychoanalysis (75, 82, 99). Play methods today are variously used and interpreted, but many analysts still claim them as their own special prerogative (79).

In our times, the indebtedness to psychoanalysis is becoming somewhat more even. Psychiatrists, including analysts and psychoanalytically oriented psychologists, are going beyond the traditional techniques of free association and dream interpretation, and are turning with increasing interest to the illuminating and time-saving data which the projective methods appear able to provide (155, 156).

2. "*Global*" theory. The period in which projective methods have developed is pervaded by revolt against what has been termed the *atomistic* tradition of the early experimental psychology, especially behaviorism, represented in the personality field today by investigations concerned with trait lists, rating scales, psychographs and other *objective* methods. Tests such as the Bernreuter and other personality inventories purporting to measure such traits as introversion-extraversion, dominance-submission, neuroticism and the like, imply what Allport has called *omnibus* or *sum-total* definitions of personality (210, p. 43).

Atomistic research is alleged to begin with the attempt to analyze psychological phenomena into elements. Opposed to this viewpoint is one which has been variously termed *global*, *holistic*, *organismic*, or *field theoretical*. Lewin's topological concepts (249), Allport's version of William Stern's *personalistic psychology* (210), Murray's adaptation of organismic theory (14), and the dynamic approach recently advocated by Maslow (253), differ somewhat in conceptualization, but unite in stressing the importance of totality and wholeness. Murray, whose theory of personality leans heavily upon the organismic biological viewpoint, quotes the following from E. S. Russell:

The organism is from the beginning a whole, from which the parts are derived by self-differentiation. The whole and its parts are mutually related; the whole being as essential to an understanding of the parts as the parts are to an understanding of the whole (14, pp. 38-39).

Murray and Maslow have both emphasized a rather fundamental division among psychologists, not only in the holistic-analytic controversy, but over the entire range of theory construction. Maslow, who describes his view as "holistic rather than atomistic, functional rather than taxonomic, dynamic rather than static, dynamic rather than causal, purposive rather than simple mechanical," points out that writers who "think dynamically" are also inclined to think "holistically rather than atomistically, purposively rather than mechanically, and so on" (253, p. 520).

The emphasis which Maslow places upon the word *dynamic* demands a brief digression at this point, since the word has been widely and often indiscriminately used, and hence has been subject to criticism. The term is, apparently, as essential in the vocabulary of the psychologist who regards interactions between parts of a system as more important than the parts themselves, and who needs to describe the process of complex change *per se*, rather than a succession of static frames run together in a moving picture. To the *dynamic* psychologist, the *moving picture* cannot be described in terms of the sum of cross-sectional views. The accusation of vagueness is, perhaps, inevitable since the term refers to phenomena which themselves lack precision. Fairly representative of current usage is the following definition:

Since psychology deals only with motion—processes occurring in time—none of its proper formulations can be static. They all must be dynamic in the larger meaning of this term. Within recent years, *dynamic* has come to be used in a special sense: to designate a psychology which accepts as prevailingly fundamental the goal directed (adaptive) character of behavior, and attempts to discover and formulate the internal as well as the external factors which determine it (14, p. 36).

Murray, like Maslow, attempts to brand psychological sheep and goats by setting the *peripheralists* off against the *centralists*. Peripheralists, he states, are attracted to observable things and quantities; they prefer to confine themselves to measurable facts. For them the data of psychology are environmental objects and physiologically responding organisms: bodily movements, verbal successions, physiological changes.

If the peripheralists ever do indulge in speculation about what goes on within the brain, they usually fall back upon the conceptual scheme which has been found efficient in dealing with simpler partial functions . . . Men of this stamp who study people usually come out with a list of common action patterns and expressive movements, though occasionally they go further and include social traits and interests (14, p. 7).

The centralists, on the contrary, are attracted to subjective facts, such as feelings, desires, and intentions. Their terminology is subjectively derived and "they do not hesitate to use such terms as wishes, emotions, and ideas" (14, p. 8 ff.). They are conceptualists rather than positivists.

It may be that we encounter here an example of what Seashore has called the *all-or-none fallacy* in the acceptance or rejection of a given viewpoint (263, p. 605). On the other hand, these differences reflect an age-old conflict between empiricism and rationalism, positivism and phenomenology, which has been felt in the physical sciences as well as in psychology. Whether or not this is a pseudo-issue or a real one, the hope for early reconciliation is not bright, as long as the *globalist* yawns in boredom over the statistics of the *specifist*, and the latter sneers at the constructs of the former. We should, perhaps, cultivate tolerance toward the extremists in both camps and recognize the stimulus value of controversy. We can also admit the truth of Murray's comment that "personology is still in diapers, enjoying random movements" (14, p. 6), and hope that as the infant matures his activity will become better channelized.

The special relevance of the global, conceptual approach to projective methods is clarified by an example which Maslow has used, stressing the point that his attack is not upon science itself but upon *one* possible view of science, which he calls the *reductive effort*, i.e., the attempt to analyze psychological phenomena into fundamental variables without taking account of unity and interaction.

If we take an example, such as blushing or trembling or stammering, it is easy to see that we may study this behavior in two different ways. On the one hand we may study it

as if it were an isolated, discrete phenomenon, self-contained and understandable in itself. On the other, we may study it as one expression of the whole organism, attempting to understand it in its richness of inter-relationships with the organism and with other expressions of the organism. This distinction can be made clearer if we make the analogy with the two possible ways of studying an organ like the stomach. (1) It can be cut out of the cadaver and laid on the dissecting table, or (2) it can be studied *in situ* in the living functioning organism (253, p. 516).

Projective methods, it is claimed, are one means by which aspects of personality may be studied without distortion. Harrison suggests that "the global approach at least respects the complexity of personality problems and seeks some elementary understanding before bursting into figures" (154, p. 50).

Before leaving the discussion of holistic viewpoints, brief notice should be taken of the fact that, at least in psychology, this approach had its inception in *Gestalt* theory, which began with Wertheimer's well-known studies in perception about 1910. Aside from its indirect theoretical influence, the *Gestalt* experiments in the patterning of perceptual experience have a more direct bearing on projective techniques. If personality is defined as "a dynamic process of organizing experience" (5), the manner in which a person perceives is quite as important as how he behaves or what he says. This has led to great interest in the selective response of individuals to ink-bLOTS or nonsense sounds, and in the formal structures imposed upon expressive mediums. Tests such as the Rorschach (102-142), Murray's Thematic apperception test (TAT, 143-173), or Shakow's Tautophone (174-178), depend on selective attention and perceptual organization; hence the determinants of response can be studied as well as the response itself. Concern with these determinants and with the way in which they are patterned by subjects is reflected in the formal scoring categories of the Rorschach, in certain approaches to TAT analysis (145, 160, 173), in Benders' analysis of form qualities in children's games and drawings (29, 64), in Kerr's and Wertham's analyses of form elements in the Lowenfeld mosaic test (193, 204), and in Erikson's use of spatial variables in describing the play of children (72, 73, 74). It should be emphasized that, although the formal approach to scoring is no more exclusively dependent upon specific *Gestalt* doctrine than content analysis is upon orthodox Freudian dogma, a close relationship exists.

3. *Support from general science.* L. K. Frank, approaching the problems of personality from the standpoint of a student of psychology as one among other sciences, finds much to support the newer concepts in personality research and the methods based upon them. His important article, quoted at the beginning of this review, ought to be read in its entirety for its abundant illustration from fields in which the busy psychological specialist has little time to become oriented.

With reference to the controversy discussed in the preceding section, Frank shows that the older sciences, including physics, have been forced to develop new approaches demanded by a changing view of the space-time universe, but have been able to digest revisions of theory with less heartburn than psychology has experienced.

Theoretical physics has adjusted itself to the conception of a universe that has statistical regularity and order, and individual disorder, in which the laws of aggregates are not observable in the activity of the individual making up these aggregates. Thus, quantum physics and statistical mechanics and many other similar contrasts are accepted without anxiety about scientific respectability. The discrete individual event can be and is regarded as an individual to whom direct methods and measurements have only a

limited applicability. We can therefore acknowledge an interest in the individual as a scientific problem and find some sanction for such an interest (5, p. 395).

Frank compares our factor analyzing and trait isolating techniques to the analytic-destructive methods in 19th century physics, which required the breakdown of the substance studied, and hence failed to reveal their true nature. For example, physical phenomena such as temperature and light, which were once studied in isolation, are now seen as transformations of energy variously manifested. In the indirect approaches to personality through a study of its projection in *neutral situations* or *unstructured fields*, Frank finds a parallel to the use of electric current or polarized light in determining the composition of substances through their effect upon these media. It is just such methods as these that have led modern physics to the discussion of processes *within the atom* and to an interest in the behavior of individual electric particles which are themselves not directly observable. Similarly, he holds that personality, which is not observable in essence, can be understood as an organizing process through its projection on the screen of a meaningless ink-blot or a formless chunk of clay. If these criteria appear subjective and incredible, Frank points out that certain methods in physics are also open to criticism.

Personality studies by projective methods have not, of course, been as extensively used, nor have the patterns used by subjects been so well explored. The important point is that the way is open to the development of something similar to spectroscopic and diffraction methods (5, p. 406).

Better known in general psychology, and more influential outside the field of personality, is the physicist Bridgman, whose introduction of the "operational definition" has had a far-reaching influence on psychological thought (see Kantor's discussion, 244). For Bridgman, a concept must be defined in terms of the operations by which it was derived; for example, dimensions are defined in terms of meter sticks and time by clock readings (220). Frank's definition of personality as process, "a way of living and feeling," or "a manner of organizing and patterning the life situation" leads to an operational definition of personality as that which an individual does in situations described as projective.

If it appears that the subject projects similar patterns or configurations upon widely different materials and reveals in his life history the sequence of experiences which make those projections psychologically meaningful for his personality, then the procedures may be judged sufficiently valid to warrant further experimentation and refinement. In undertaking such exploration, the experimenter and clinician may find reassurance in the realization that they are utilizing concepts and methods that are receiving recognition and approval in scientific work that is today proving most fruitful (5, p. 409).

History of related research

1. *Studies in imagination and phantasy.* In 1930, when the writer happened to undertake a paper on the subject of phantasy, very little experimental work had been done from the individual point of view. Empirical material was available in psychoanalytic case studies, but emphasis was placed upon the description of typical, *universal* fantasies, such as the *oedipus phantasy* (247), the *phantasy of illegitimacy* (248), *phantasies of rebirth* (252), and a number of others (228, 230, 237, 259). Much space was devoted to the symbolism of phantasy and its relation to dreams and myths (230, 252), but although it was recognized that the personal meaning of daydreams is less disguised than in

dream content, and that the subject is more loath to disclose them (247), interest in techniques for eliciting such material had not developed. L. P. Clark, apparently, must be credited with the first attempt to stimulate phantasy, using it as an approach to narcissistic patients incapable of transfer (224).

The psychological literature, although it reflected the growing emphasis upon affective and conflict-solving aspects of imagination, was concerned with phantasy chiefly as one manifestation of thought; as a psychological process rather than as a key to individual mental life. Varendonck had produced an extended analysis of daydreams, based on an introspective examination of his own foreconscious activity (269), and a systematic developmental study of day-dreaming had been published by Green (234). Lehrman had written several articles on the compensatory nature of normal and neurotic phantasy (247, 248); imaginary playmates had been studied as the projection of young children's needs and wishes (237); and Conklin, in one of the earliest attempts to test psychoanalytic theory by a psychological technique, had conducted a questionnaire study of the *foster child phantasy* as recalled by college students (225). Although the Rorschach test was nine years old, already in use in Europe, and arousing the interest of a small group of American workers, there were few references to it in the English literature.

If the individual approach had been neglected, an experimental attack on imagination as a mental function had not. Galton, among his many interests, began investigations of imagery in 1883 (231). Binet and Simon used ink-blots in early tests (217), and this use was extended by American experimentalists including Whipple, Dearborn, and G. S. Hall. (See review of early work in Krugman, 128.) Although these studies were largely concerned with cognitive rather than emotional aspects of phantasy, they form one branch of the ancestry of present projective methods because of the materials and techniques suggested. The most recent experimental approach to developmental aspects of imagination and its relationship to cognitive thinking was published by M. D. Vernon in 1940 (260).

The earliest direct forebears of the best known and most widely used of modern projective methods (Rorschach and Thematic apperception) were Brittain's investigation in 1907 of imagination by means of compositions written in response to pictures (221), and the use of ink-blots by Bartlett, another English researcher, in 1916 (214). The latter, in his use of the blots, went beyond mere investigation of imagination, and speculated on differences in intelligence, background, vocational interests, and the like. Content was analyzed, and in many ways the handling of the materials bears striking similarity to the method which Rorschach later developed.

Hermann Rorschach, Swiss psychiatrist, first published his *Psychodiagnostik* in German in 1922 (135). As noted above, Rorschach was not the first to use ink-blots, but he was the first to develop a workable method (a *short-hand* as Beck has called it) for handling the complex individual response pattern. Rorschach himself died shortly after the publication of his famous work, but a tremendous amount of research has followed. The test is widely used in clinical diagnosis (103, 104, 108, 124), has been introduced in the armed services for research and diagnostic purposes (112, 113), and has been applied to a variety of problems, including psychopathology (104, 124, 133), developmental psychology (122, 126, 127) and recently to vocational guidance (134), not to mention innumerable other problems of personality research. (For comprehensive reviews and bibliographies, see references 116 and 128.)

Historical milestones in the progress of Rorschach research in this country have been the publication in 1924 of the Rorschach-Oberholzer monograph in

the *Journal of Nervous and Mental Diseases* (136); Vernon's article in 1933 which called attention to the success of the test in Europe (138); the publication of Beck's *Introduction to the Rorschach Method* (103) in 1937 (the first systematic guide to administration, scoring, and interpretation); and the founding of the Rorschach Institute in 1939, with Klopfer as its guiding spirit and the *Rorschach Research Exchange* (established in 1936) as its medium of communication. In 1942, two books appeared almost simultaneously, one by Klopfer and Kelly (125), and a somewhat overpopularized presentation by Bochner and Halpern (108). At the time of this writing a new book by Beck is in press (106). There is probably no topic in psychology concerning which *pro* and *con* feeling runs higher, but despite the rash enthusiasm of converts and the blind opposition of skeptics, it has grown in use and reputation. White refers to the Rorschach as "a good example of that happy combination of genius and hard work which the study of personality so sorely needs" (23, p. 227).

Another important family of projective tests made its appearance in the American literature in 1935 with the publication of Morgan and Murray's paper on a method for investigating phantasy (157). Here the basic technique of the Thematic Apperception (TAT) test was first described. The test consists of pictures which the subject is asked to use as illustrations for plots of his own creation. Certain investigators, Harrison among them (152), still prefer this earlier series of pictures to later modifications introduced in the set now provided by the Harvard Psychological Clinic (158).

Historically, as well as from the point of view of standardization, these two methods (the ink blot and the picture-story) are the aristocrats of a growing clan. Others will be mentioned later; at present we are concerned with beginnings and major trends. Among these was a five year investigation of children's phantasy published by Griffith in England in 1935 (235). This study which utilized imagery tests, ink blots, dreams and drawings of fifty normal children, led to the conclusion that phantasy is one of the ways in which children deal with their problems, and hence should be viewed not merely as withdrawal from reality but as an aspect of adjustment. This finding is important both for diagnosis and for therapy.

2. *Studies in word association.* It is a well known historical fact that interest in "the association of ideas in the mind" considerably antedates the beginnings of experimental psychology. The preoccupation of philosophers with this topic gave to the British Associationist school its name. The history of the movement leads from the speculations of John Locke down through the conditioning experiments of the modern behaviorists. Galton's work in 1879, Wundt's in 1880, and the introduction of association experiments into American laboratories by Cattell, Munsterberg, and Jastrow before 1890, marked the beginning of scientific interest in associational activity (226).

As in the studies of imagination, interest from the individual standpoint developed first in psychiatry, followed a parallel course, and finally gained enough momentum for recognition by psychology in general. It was not until the publication of Jung's first studies in word association in 1904, followed by the extensive experiments of Kent and Rosanoff in 1910 that the significance of association tests for personality study became impressive. Moreover, in the statements of early users of the method, we find concern with a problem which we have already seen as central in modern personality study: that is, the search for techniques which not only add to our knowledge of what Titchener called the "generalized, normal, adult, human mind," but serve as an approach to the whole, unique personality. Bleuler, in his chapter in Eder's translation of *Studies in Word Association*, writes:

In the activity of association there is mirrored the whole psychical essence of the past and of the present with all their experiences and desires. It thus becomes an index of all the psychical processes which we have but to decipher in order to understand the complete man (218, p. 4).

Eder points out in his own introduction to Jung's *Studies* that the departure we owe to Jung is the application of the association method to unconscious mental processes, and the theory of unconscious complexes (243). Thus it represents the first effort to study the deeper strata of personality by an experimental technique. Again stressing the importance of studying psychic functions in context, Jung writes:

We must bear in mind that the association experiment cannot deal with a separated psychic function, for any psychic occurrence is never a thing in itself but is always the resultant of the entire psychological past (242, p. 225).

The work of Kent and Rosanoff which led to the compilation of frequency tables for the evaluation of common and unusual responses to word lists, and their efforts in the direction of standardizing both technique and interpretation (245, 260) were followed by numerous other studies by Hull and Lugoff (238), Woodrow and Lowell (274), and Woodworth and Wells (273), to cite only a few. An excellent bibliography of this material is furnished in H. R. Crossland's monograph published in 1929 (226). Of special interest in conjunction with projective methods is the fact that similar problems of standardization were encountered. Wells and Woodworth point out that standardization cannot easily be accomplished. They conclude, however, that such difficulties do not detract from the significance of association techniques.

Few procedures in experimental psychology have so richly rewarded their investigators with the possibilities of practical application as the association method . . . Within the past seven years it has achieved and bids fair to hold indefinitely its place in the foremost rank among the methods of individual psychology (273, p. 73).

Although the method has been supplemented to some extent by more flexible techniques for tapping affective thought and phantasy, this estimate does not appear extreme even today.

3. *Studies in language.* Although the recent revival of interest in language analysis has a history of its own and is not strictly a branch of projective research, the two topics have several points in common. The first of these is an interest in the formal qualities of expression.

Language traditionally has been known as the "vehicle of thought" with the thought attracting far more attention than the vehicle. But there are those who object to the traditional distribution of attention on the ground that the vehicle as well as the freight should be given systematic scrutiny (261, p. 181).

Piaget's extensive investigations of children's language usage (257, 258) as an approach to the ontogenetic evolution of thought and socialization, have stimulated a great deal of interest in this area. Although his emphasis is upon establishing universal generalizations appropriate with reference to the progressive developmental stages of social and moral consciousness, rather than the clinical study of individuals, Piaget's recognition of the manner in which language forms (such as egocentric expressions and causal statements) may reflect the *inner* or emotional level of the speaker, bears a significant relationship to the theory underlying projective experimentation.

Southard, the psychiatrist, made an earlier application of formal language

analysis to personality structure, pointing out a similarity between the use of the four grammatical moods (imperative, indicative, subjunctive, and optative) and the traditional temperaments: choleric, phlegmatic, melancholic, and sanguine (265). Grings has recently used grammatical classifications in analyzing responses to *Tautophone* records (174), and Balken and Masserman have suggested others which have been applied in studying the TAT protocols of neurotic patients (145). Among the categories utilized, these authors revived Busemann's verb-adjective ratio and offered further evidence that high quotients are associated with anxiety and instability (144, 145). Johnson (239, 240) and Boder (261) have also used this and other formal counts in studies of written materials.

Research in language undertaken from this viewpoint is compatible with Frank's conception of personality structure. If a personality does, as he assumes, organize experience in terms of its "own private idiosyncratic world of meanings," it is logical to extend this assumption to include an individual's choice of language for self-expression as one aspect of personality. If this line of research is to prove truly productive, results are likely to come, as Sanford suggests, from a search for psychologically meaningful categories, in place of strict adherence to traditional grammatical modes of analysis (261, p. 831).

The recent interest in semantics is another expression of the conviction that no manifestation of personality is meaningless or outside the legitimate field of investigation (255, 272). Although the semanticists appear to insist on a peculiar reversal of what would seem the more acceptable conclusion, in assuming that bad semantic practices produce rather than result from maladjustment, their work has focussed attention on possible relations between speech and personality (241, 246). Since many of the projective methods elicit a verbal response expressed in a subject's own idiom, analysis of language forms has direct bearing on these problems.

4. *The use of "personal documents."* Gordon Allport has long been interested in what he terms *idiographic* as opposed to *nomothetic* research. The former is simply another name for research concerned with the single case, and the latter is used to describe normative science which seeks to establish uniformities. In the personal document Allport sees the ideal datum for the intensive study of individuals. His recent monograph (209) traces historically the use of such materials; discusses the possibility of quantitative treatment from the idiographic point of view; points to various studies which offer methods for judging reliability and validity, and cites a number of examples showing their usefulness. Since Allport's definition is applicable to any projective protocol, it is pertinent here:

The personal document may be defined as any self-revealing record that intentionally or unintentionally yields information regarding the structure, dynamics and functioning of the author's mental life (209, p. xii).

In defending the use of such data (which until recently have been considered worthless for scientific purposes because of their subjective nature) Allport discusses Clifford Beer's classic *A Mind That Found Itself* (216) and comments:

From the point of view of controls few documents are worse, yet from a pragmatic point of view we are warned that scientific safeguards will not in themselves save a poor document from the dust pile nor prevent a good one from contributing to the course of scientific progress (209, p. 11).

We are probably justified in the following inquiry: Suppose we study care-

fully Beer's document. Suppose, also, that this source of information is supplemented by other data which enable us to know the writer so well that we might predict his subsequent acts, and might even conceivably express relationships within his personality in numerical terms, as Baldwin did in a single case study using intra-individual statistics (212). What have we added to the science of personality? What does our knowledge of Beers contribute to our knowledge of others?

Allport would reply that this question is raised from the nomothetic point of view and is the result of thinking only in terms of generalization and comparison. His emphasis is expressly not upon the study of an individual case as a basis for generalization but, rather, as a legitimate scientific end in itself. Although Frank has rallied support from other disciplines for single case research and Lewin has argued its scientific respectability (249), on the basis of Allport's presentation it seems desirable to go beyond the rationalization "They do it, why can't I?" which imitators of physical science are prone to use in support of borrowed methods. Allport does not explicitly state the following answer, but it runs throughout his monograph by implication. It is necessary to assume that the final justification for the study of particular individuals lies neither in what we learn about personality *in general*, nor in what we learn about Beers, or any other unique individual. It is, rather, what we learn about *how* to know Beers that provides an approach to other case studies, thus leading in the direction of valid prediction. The predictions for which validity is sought are not predictions for other individuals on the basis of one, but for one individual based on sample observations designed to illuminate the dynamics of his own personality.

Although Frank and others grant that investigations based on such a philosophy are in the exploratory stage, preoccupation with the problem of controlling observation technique in such a way that the behavior studied is not distorted nor its unifying principles obscured, distinguishes the newer approach. The special questions which arise in relation to control of experimental conditions are discussed later under *Techniques* and in the section on *Methodology*. It is sufficient to note here that single case research, the use of personal documents, and the projective techniques, all share in common the objective of discovering sound and reliable, and at the same time more penetrating and comprehensive methods for the study of personality.

APPLICATIONS

There are several ways in which projective methods may be classified. They may be grouped according to:

1. the nature of the materials used for projection,
2. the functional use which the subject makes of the materials,
3. the techniques of presentation used by the experimenter, and
4. the purposes which govern the various applications.

The diversity of the methods themselves, and the variety of ends served can best be illustrated by considering the techniques under each of the above headings.

Materials. Ink-blots, as we have seen, are the oldest and from many points of view the most versatile of the materials used. In the first place, they have a definite structure which makes it possible to classify responses in terms of specific determinants, an advantage which is lacking in more vague mediums, such as Stern's cloud pictures (202). At the same time, they are less meaningful in terms of personal experience than pictures, which may have rather definite as-

sociations. An additional advantage of the blots is that they elicit a response in which factors can be scored both for content and for the characteristics of its formal pattern.

Pictures, such as the TAT set (158), are about equal in popularity, and although they are subject to the limitations discussed above, they often provide a more readily intelligible sample of thought content for interpretation. Amen developed a series of pictures for use with children which included silhouettes and movable figures (143). Symonds has set up criteria for the selection of pictures suitable for use with adolescents (170). In the Szondi test, pictures are presented in pairs, the subject being asked to choose the one preferred or disliked (2, 200). Horowicz has made use of a similar technique with children (189, 190, 191).

Other materials include stories which the subject is asked to retell or complete (159, 183, 186, 187). Art media, such as clay modelling, finger painting, and drawing have been extensively used (25-47). Materials such as blocks (57, 58), and mosaic patterns (193, 204) have also proved effective. Dramatic play, ranging from the puppet shows used by Bender, Wolmann and others in group treatment (48, 52, 53, 56) to the psychodrama introduced by Moreno and his coworkers (49, 50, 54, 55) has been utilized. A unique device introduced by Skinner and adapted by Shakow, Grings, and Trussell, is the so-called *Tautaphone* or verbal summarator (174-178). This instrument produces low vowel sounds which resemble speech. Subjects are asked to tell what the voice is saying, thus projecting their own preoccupations and meanings into an auditory medium. Pickford made use of nonsense syllables as projective materials (198) and Mira turned the simple motor task of drawing lines, into a *myokinetic* technique for studying various aspects of personality (196). A recent attempt has been made by Sargent (201) to incorporate projective principles in a "paper and pencil" personality test for group use.

Functional uses. Frank (5) distinguishes:

1. *constitutive* methods, in which the subject imposes structure upon unstructured or partially structured materials;
2. *interpretive* methods, in which the subject is led to express or describe what a stimulus situation means to him;
3. *cathartic* methods used for the discharge of affect; and
4. *constructive* methods which call upon subjects to organize and arrange materials according to their own conceptions.

There is, of course, considerable overlap in this classification. Constitutive methods are exemplified by the various plastic media. The one criterion is that the material should be amorphous and easily adaptable for subjective expression. The interpretive methods category is illustrated by inkblots and pictures. The attribution of meaning is not, however, confined to such stimuli. Whether the subject moulds his own object or responds to one ready made, subjective interpretations direct or symbolic, verbalized or implied, are usually evident. Likewise, discharge of affect is thought to be present to some extent in all of the experimental situations. It is generally assumed that the subject sees in an inkblot what he *must* see in order to solve unconscious conflicts; in his story themes he voices his dilemmas and arrives at emotionally satisfying outcomes.

Ordinarily, the cathartic function is most evident in techniques which are suited to the release of aggressive impulses, as in certain play techniques. Despert's experiment involving the use of a knife (182) is an interesting attempt to provide both for the expression of aggression and for its eventual reorganiza-

tion into more socialized activity: Children were allowed to use a knife to scrape cardboard into shreds (destruction); next they were given water with which to mix the materials into a plastic (gratification of the supposed impulse to *mess*); and finally they were encouraged to use this product for the construction of masks for use in play.

Finally, under constructive methods we may list blocks, mosaics, and building materials, as well as such highly specific objects as dolls, household articles, and *world toys* (181, 194) from which the subject constructs his *microcosm* (a term used by Erikson [74] to describe the miniature life scene depicted in the play model). Wertham has developed differential diagnostic criteria for the mosaic test, which he advocates as simpler and less time consuming than the Rorschach. Patterns are derived which in many respects parallel the Rorschach findings for various personality syndromes found in psychoses, neuroses, and organic conditions.

Techniques. Classification by techniques may be made both on the basis of differences in experimental control and in approach to interpretation. Control is introduced first according to the nature of the chosen stimulus. Degree of structure varies on a continuum from unstructured clay to definitely representative toys. Here a paradox is introduced. The more structured the material, the more limited is the subject's range of response. Hence, *subject controls* vary inversely with control over the essential *neutrality* of the situation itself, thus defeating the very purpose of control, which is to provide a standard by which response variations may be judged. As structure is increased, meaning also increases and there is less opportunity for personally significant differences from subject to subject to appear. Moreover, when differences do appear, the impossibility of estimating effects of experiential background furnishes an uncertain ground for comparison. The same is true when special techniques of presentation, such as paired comparisons, set questions and the like are introduced, since there is no way of equating their stimulus value for different individuals.

This has been called the *stimulus fallacy* by L. L. Thurstone. Frank, in his introduction to the Lerner-Murphy monograph (7), cites an early paper of Thurstone's in which he expresses the view that a subject creates his own stimulus to which he then responds in characteristic manner, hence a stimulus situation, no matter how well *controlled* does not always mean what the tester intends (268).

In projective experiments the fallacy is turned to account and the variegated qualities of a stimulus not only cease to be a disadvantage, but become of crucial importance. For example, when a subject sees sexual symbolism in an inkblot which others view as a landscape or as an animal form, or when Bender's children spontaneously produce such material in drawings (28), it is more logical to regard these productions as individually significant than the attitudes elicited by Levy's controlled and highly suggestive procedure. The latter presents the child with dolls and clay, the child is encouraged to make breasts for the mother, and the baby is put to nurse. This method is highly successful in drawing out sexual attitudes as well as hostility, but how much of this effect should be attributed to the technique, and how much to the child is a debatable question (83).

The range of procedural variations is illustrated by contrast between the standardized methods of Levy (83, 84), Ackerman (57, 58), the somewhat more flexible techniques of Conn (66, 67, 68), and Solomon (95, 96), and the almost complete freedom of action maintained in some free play situations (74).

Interpretive systems for handling responses range from the empirical analyses of Harrison (152, 153) to conceptualization based on psychoanalysis or the Murray press-need system (14). Interpretations also vary in the relative

emphasis on form and content. In Bender and Wolmann's reports of group responses to puppet shows (48, 56) and Despert's analysis of play situations (69, 70, 71, 182), symbolic interpretations of content are emphasized. In the mosaic test (193, 204) form is paramount. In Homburger Erikson's studies, content is interpreted from the psychoanalytic viewpoint but spatial variables are also introduced and interpreted in terms of configuration (72-74). Of the two most extensively used tests, the Rorschach and the TAT, the former relatively stresses form and the latter relatively emphasizes content. These two, however, fall somewhere near the middle range in the use of both scoring approaches.

Purposes. An examination of projective methods with regard to the ends they serve shows three major purposes for which they are commonly used. These may be subsumed under the topics of diagnosis, therapy, and experiment.

1. *Diagnosis.* As already indicated, projective methods developed first in the clinical setting as devices for tapping phantasies, sampling conscious and unconscious thought, and revealing the characteristics of individual perceptual organization. As a psychiatrist, Rorschach's primary aim was to provide a method which would help to illuminate dynamic factors in mental disease and serve as an aid to differential diagnosis. Recent reports on the clinical use of the test, and the demonstrations of fairly stable response patterns for various pathognomonic conditions, have gone far toward the realization of that aim (103, 105, 125). The more recent TAT is also demonstrating similar potentialities (151, 160, 161).

In child analysis the special diagnostic value of play, which has been described as the child's language, a medium of expression which precedes facility in verbal communication, was first recognized by Melanie Klein. Anna Freud has also been a pioneer in the use of play techniques, but she has evolved an approach which is far more conservative than Klein's. Freud (75) uses play primarily to gain rapport and insight, reserving deep analysis for later stages of therapy; Klein, however, regaled her fascinated young patients with symbol interpretation from the beginning of the first contact (82). Following these leads, play situations were used extensively by others as an adjunct to both diagnosis and therapy (57-100). Sargent (93) has reported an observation of a normal child which tends to confirm observations and interpretations of play made under clinical conditions. As a diagnostic method play has been used more informally than formally, but certain controlled techniques are being developed (67, 84) and other possibilities, such as the adaptation of play methods as a readiness test for preschool children, have been explored (97). Mayer and Mayer (87), Rosenzweig and Shakow (91), and Murray (14) have adapted certain play methods for use with adults.

2. *Therapy.* It was soon discovered that expressive methods, especially play, art techniques, and drama, frequently served a double purpose. Insight into pathogenic factors and adjustment mechanisms was obtained, while at the same time the release which the projective situation both stimulated and permitted, appeared therapeutic in its effect. The literature is replete with case material indicating that play therapy can bring about reorganization and reintegration of attitudes (65, 81, 85, 98). Some workers attribute the benefit to the release and desensitization provided by play itself (83, 84, 88); others believe that improvement comes indirectly as the result of relationship with the therapist which the latter uses in treatment (59, 65, 75, 79); still others hold that insights developed in play and verbalized by the child are essential for therapy to take place (66, 67). Some form of interpretation, support or suggestion from the therapist, directly or indirectly given to the child, is considered necessary by

Cameron (65), Liss (85), Solomon (95, 96), and others but all except Klein (82) recommend extreme caution in its use.

Whatever the explanatory theory, experimenters with projective techniques are in substantial agreement that emotional growth and symptom remission can and often do result, even when the methods are used primarily for diagnostic purposes. Experience has demonstrated, in fact, that a rigid distinction between diagnostic and therapeutic contacts is unjustified and perhaps dangerous (97). In the course of therapy, information is gained which leads to greater precision in diagnosis; whereas even in the short diagnostic session the subject undergoes an experience which can be traumatic, or therapeutic, or neither, depending upon the emotional state of the patient, and the handling of the relationship with the clinician. Even in a relatively stereotyped situation, such as an intelligence test, favorable or unfavorable changes may be initiated, as in the case of a child seen at the Psychological Clinic at Northwestern University who, following an intelligence test, announced to his mother that the examiner had "taught him to concentrate." In the projective situation such changes can be quite radical, depending upon how effective that situation is in releasing impulses, and upon the manner in which the resulting anxiety is handled. These facts have caused many writers to urge that only trained persons should use projective methods, and that experienced psychologists should handle them with caution (78, 79). Certainly the practice of interpreting the results of projective tests to subjects and, for that matter, the irresponsible passing out of test scores of any kind, cannot be too severely condemned.

3. *Experiment.* Extensive use of projective methods for research purposes has been made in the Harvard Psychological Clinic under the direction of H. A. Murray. An ambitious personality study of fifty-one paid subjects (most of them Harvard students) utilized projective tests such as the Rorschach, Murray's own TAT, and certain tests devised specifically for this investigation. Among the special tests were *imaginal productivity* tests (including story completion, *smiles*, and *Beta* inkblots), *dramatic productions*, and *musical reveries*. The battery also included a variety of non-projective tests including measures of hypnotizability, level of aspiration, reactions to frustration, and the like. Conspicuously absent were the usual inventories and ratings. Commenting on the omission, Murray launches another attack:

We included some of the procedures commonly employed in academic studies: intelligence tests and a variety of questionnaires, but these contributed little to our understanding. American personologists base their conclusions on a much larger number of subjects than we studied, and in this respect their findings are more representative than ours. What they usually study, however, are the physical attributes of movement, manifest traits and superficial attitudes, facts which subjects are entirely conscious of and quite willing to admit. Thus their researches do not penetrate below the level of what is evident to the ordinary layman. . . . The original data, then, are of uncertain value, and no amount of factor analysis can make them more reliable (14, p. 33).

At Sarah Lawrence College, Lerner and Murphy and a group of collaborators have conducted a four year study of nursery school children in which projective techniques have played a leading role. Their equipment included *miniature life toys*, *sensory toys*, and plastic materials such as dough and cold cream. Group play formed a part of the experiment, and several ingenious *active play techniques* were introduced (7).

Both the Murray and the Lerner-Murphy experiments were exploratory in nature; designed to gather a variety of information "which would somehow il-

luminate personality development." Lerner and Murphy state that they have "accepted the general focus of working toward a small collection of intensive case studies" (7, p. viii). Their announced aim is to gather cross-sectional data at a later time when the intensive studies have given direction to the search.

In other experiments, projective data have been used to throw light on many different psychological problems. Horowicz used paired pictures in developmental studies of race prejudice (190), self-identification (189), and social conformity (191). Aggression in children has been the subject of several studies, utilizing various techniques; Baruch used a free play technique with young children (61); Fite has made use of rather specific questions and comments to stimulate aggression in her subjects (185); and destructive behavior has been investigated by Ackerman in an ingenious experimental set up using blocks. In the latter study, the child upon entering the room was confronted with two rows of toy structures, one torn down ready for building, the other set up to invite demolition, thus offering an opportunity to study the contrasting behaviors of different children (57, 58).

Frustration studies have utilized projective techniques as auxiliary tests (162, 167). Bellak investigated the projection of aggressive feelings in TAT stories told after the first five plots offered by a subject had been severely criticized (148). Sarason has applied the TAT in experiments with feeble-minded girls (166), and Slutz discussed its value for developmental studies (169). Investigations of attitudes using projective devices have been carried out by Tuddenheim (203), Dubin (184), and Proshansky (199). Tuddenheim used a *reputation test* as a measure of projected attitudes; Dubin predicted the answers to attitude tests on war, government and labor on the basis of play constructions built by undergraduates on the subject "the world as I see it." Proshansky's experiment involved comparisons between replies to a labor attitude scale and interpretations of pictures which had been previously judged ambiguous as to "outcome for labor." Adaptations of other techniques have been turned to projective use, as in Buhler's study of neurotic and normal performance on the 1916 Stanford Binet *ball and field* test (180), and in Marquardt's use of eight simple oral questions based on an idea suggested by Binet (195). All of these studies present some degree of positive results in the direction expected according to the hypothesis of projection.

EXPERIMENTAL RESULTS

✓ Projective methods are not yet ready to fill a bulky section on *experimental results* if by that title is meant a list of findings in crucial experiments. The preceding section gives a cursory view of the problems to which they have been applied, and indicates the general trend of results. Although a great deal of incidental information has been contributed to personality study, psychopathology, and special problems, it seems important at this state of development to examine results which support theories on which the techniques are based, and the findings of experiments designed to test the efficacy of the methods, rather than to classify miscellaneous outcomes of innumerable investigations covering a wide range of psychological phenomena, from psychiatric problems to social attitudes. As long as projective methods remain in the exploratory period, research interest should be focussed on questions of method itself. In the final section of this survey, methodological problems will be discussed. At present it is necessary to examine a few outstanding researches which bear on underlying assumptions and predictive value.

Two experiments, one by Sears and one by Murray, are worth noting because of their attempt to demonstrate experimentally the basic mechanism of

projection. Sears used a rating scale technique in which a group of fraternity men were asked to rate themselves and others on the possession of certain traits. On the assumption that some individuals would use projection to protect themselves from the acknowledgment of undesirable traits in their own personalities, Sears further assumed that the largest amount of projection would occur in those who lacked insight. A subject's average rating by others was used as the estimate of his *true* score in a trait; his average score in attribution of the trait to other individuals was taken as the measure of projection, and agreement between self and others' ratings provided the criterion of insight. Results were in the expected direction: those who were more *stingy* than average, and who lacked insight into that fact, rated others higher in stinginess, on the average, than did those who were equally stingy but recognized this characteristic. Each trait in Freud's *anal erotic* syndrome (stinginess, obstinacy, disorderliness) was given more extreme ratings by the insightless group. Sears concludes:

Without belaboring the question of whether lack of insight was a result of repression in a Freudian sense, or whether it was a conscious or unconscious process, it can be said that the effects of projection have appeared in this situation in a way that was predictable from the present redefinition of that process (19, p. 576).

Another fundamental experiment has been conducted by Murray, who has studied the effects of fear upon response to pictures (13). Two series of 15 photographs were administered to five 11 year old children at a houseparty. The photographs were clipped from *Time* and the subjects were asked to rate the maliciousness of the pictured persons on a nine point scale. Each series was administered twice, once after a *normal pleasure experience*, and once after a game of *murder*. Series A was given first under the pleasure condition preceding the *scare* game, both series were administered after the game, and series B was repeated the following morning after the effects of fear had presumably subsided. (The reality of the fear situation was further supported by the fact that one of the children actually hallucinated a burglar early the following morning!) The results show a marked increase in the *badness* scores assigned to the photographs seen under the fear condition.

A number of studies claim some degree of predictive success for projective methods, but only two will be described in detail, one of which uses the TAT, the other a modified version of the Rorschach method.

Harrison, impressed with the fruitfulness of the TAT in clinical practice, undertook in conjunction with a qualitative study by Rotter (163), a "quantified and controlled validity study" (152, 153) on the assumption that:

Evidence for the congruence and unity of the personality would be clearly demonstrated if it were shown that an individual cannot relate what at face value are impersonal stories without revealing so much about himself that a thumbnail personality sketch including characteristic traits, biographical facts, attitudes, intelligence level, personal problems and conflicts, could with varying degrees of accuracy be written from story analysis (152, p. 123).

The test was given to 40 patients at the Worcester State Hospital about whom nothing was known to the experimenter. Personality sketches were written, and the items included were subsequently checked by an assistant against the hospital records. The index of validity used was the ratio of right guesses to right-plus-wrong, which yielded a quotient expressible as a per cent. Two controls were used. First, the themes of 15 patients were randomly matched with histories, using the same technique of checking. This furnished an empirical

criterion of chance expectancy. As a second control, ten case histories were matched with ten artificial or *guessed* write-ups. Harrison obtained a validity index of 82.5 per cent correct inferences by means of his experimental technique, which was significantly higher than the indices obtained by either control method. The correlations between guessed and actual I.Q.'s was .78 with an average deviation of 9.5 points. Although diagnostic labels are themselves subject to error, guesses as to disease classification were 75 per cent correct. This figure is all the more impressive, in view of possible sources of error in the diagnosis itself as well as in the TAT interpretation.

Harrison further separated biographical from personality and intellectual items since, as the writer points out, differential validity, if it markedly favored biographical information, would detract from the practical potentialities of the method, proving the test more efficient in uncovering information easily obtainable by other means.

The comparison showed no significant difference between the two types of data, and a somewhat higher validity was found for etiological items (guesses as to motivation and causes of difficulty) than for the other item groups. In a supplementary experiment one further caution was introduced. This time the analysis was done *blind*; that is, another examiner administered the test in order to eliminate cues from direct contact with the subjects. The validity fell from 82 per cent to 74 per cent. This difference is statistically insignificant and without clinical interest, since blind interpretation is a research tool which has no place in practical diagnostic work.

Rorschach validity studies utilizing the blind interpretation technique (115, 133) as well as degree of correspondence with other criteria such as psychiatric diagnoses (107) have been promising, but because they are based on small numbers of cases and have not always been rigorously controlled, the results are interesting rather than definitive. Ruth Munroe's experiment at Sarah Lawrence College is not subject to these criticisms. Munroe's *Inspection Technique* (130, 131, 132) and Harrower Erickson's method for group presentation (113, 114) are beginning to make possible wide scale administration which should overcome some of these objections.

For two consecutive years the individual Rorschach was given to the entire freshman class at Sarah Lawrence, the protocols were scored by the *Inspection Technique* and the results were put aside until spring when a checkup on the predictions could be made. A group of problem students selected by independent criteria such as academic failure, referral to the psychiatrist, and problem behavior observed by teachers, had an average of 7.9 deviations on the check list of problem indicators, with a range of 5.1, whereas a group of 15 selected as unusually well adjusted by teachers, had an average of 2.6 deviations with a range of 1.4. Scarcely any overlapping appears between the groups (130, p. 233). Of 43 students having five checks or less, only one appeared on any list of girls having difficulty of any sort during their freshman year, and this one girl was not, according to Munroe, considered a serious problem either by psychiatrists or teachers. Only one serious problem was altogether missed, "a girl whom two psychiatrists described as delinquent and a nuisance, but probably not deeply neurotic." The author states that errors in classification did occur. Two students who were rated D+ on a scale from A to E, should have been placed in E, the lowest group. In spite of occasional misjudgments of this sort, the test acquitted itself much better than experience has led us to expect the *paper and pencil* tests to do. The Bernreuter, administered to the same subjects in this study, completely missed some of the most seriously maladjusted students (130, 132).

METHODOLOGICAL PROBLEMS

The variety and richness of material which the projective methods provide is at once the delight of the clinician and the despair of the experimentalist. The research worker who attempts to use any of these methods is immediately impressed both with their infinite possibilities for interpretation and insight, and the seemingly insurmountable difficulties in the way of scientific treatment of the data. Many able psychologists dismiss them as "vague"; no doubt they are justified in the choice of adjective. Others are challenged by that very vagueness, and the pioneer hope that there may be "gold in them thar hills" behind the fog. All scientific problems are unclear until ways are found to approach them.

Problems of quantification and standardization have been the chief source of controversy, not only between advocates and opponents of the methods, but among the enthusiasts themselves. To standardize or not to standardize, and if so how, is invariably an adequate stimulus for argument. It is generally recognized that the complexity of personality can no more be expressed by a psychograph of traits, than it can be represented by a photograph of the physical person. Another point on which nearly all can agree is that established mental test procedures cannot be carried over unmodified to the newer techniques.

Usual standardization procedures of mental tests have not been successfully applied to these (projective) methods, as it is the configuration of factors present rather than the independent quantity of each factor that describes the personality. Broad experience of the psychologist rather than statistically reliable norms is the necessary prerequisite for using these procedures (2, p. 76).

The misunderstandings which arise when configuration is overlooked are illustrated in a recent study of the relative efficacy of various personality tests used in a study of delinquent and normal girls (219). This experiment demonstrated that, contrary to expectation, the delinquents showed less of a certain Rorschach factor commonly associated with lack of control and impulsivity, than the normal high school group. As Rorschach workers have frequently explained, factors taken out of context have little meaning, for the reason that it is not the absolute amount of one determinant but its relation to the whole pattern which gives it significance in the individual protocol.

The application of standard methods for estimating reliability and validity further complicates the problem of quantification:

Reliability. In psychometrics, the usual checks on reliability have been the split-half technique, and correlations either between repetitions of the same test, or between alternate forms. None of these methods are wholly satisfactory for projective tests. For example, split-half correlations of Rorschach factors mean little because the ten cards are admittedly uneven in the type and amount of response they produce, and because the technique involves isolating factors from context. Hertz claims reasonably satisfactory results for the split-half method, but does not recommend it (116).

Repetition of projective tests is also somewhat dubious, although it has been claimed that *basic* aspects of the Rorschach pattern are little altered upon retesting (110, 124). Fosberg found that although subjects could produce *good* or *poor* Bernreuter scores at will according to instructions, they were successful only in changing content, rather than fundamental pattern on their Rorschach psychograms (110). Tomkins, however, repeating the TAT daily with a group of subjects found that 20 sessions were required to bring out all the significant themes for one person (172). This finding is enough to indicate that high reliability can hardly be expected upon just one repetition of a test.

✓ The most useful approach to the reliability of qualitative material is by means of comparisons between judges and interpreters. If a group of judges, using predetermined criteria for judgment, agree among themselves in the scoring of a number of protocols, reliability for the yardstick chosen is usually assumed. Stouffer obtained a reliability coefficient of .96 among four judges' estimates of attitudes toward prohibition based on subjects' autobiographies (266). In the application of this method the fact should not be overlooked that the coefficient may measure commonality of thinking among the judges, resulting in spurious correspondence of ratings, quite independent of the particular materials to which the judgments are applied.

✓ *Validity.* The most frequently proposed methods for establishing validity for projective techniques are (1) correspondence with other criteria, (2) internal consistency, and (3) predictive success. These are orthodox procedures which have long been advocated, but in their transfer to projective problems certain modifications are necessary due to the nature of the data which must be compared.

— Clinical data have often been chosen as the reference point in validation studies. Many experiments of this sort have been conducted, only a few of which could be included in the bibliography of this paper. (Clinical validation of the Rorschach test is described in references 107, 116, 120, 126, 129, 133, and 137; references 145, 152, 153, 154, and 163 report similar experiments with the TAT.) In handling the material, the correlation technique has seldom been applicable, since it is impossible to reduce a complicated personality interpretation, or a life history, to a single variable for plotting on a chart. As a measure of congruence between data, Vernon's matching technique (271) has been used by Kerr (193), Murray (14), Hertz (115), and many others, with good results. For example, in the Harvard experiment already described, three judges were asked to match ten sets of fantasies with ten biographies. One judge matched five, and two matched all ten correctly (14, p. 390). Likewise, of 20 mosaic patterns done by ten normal and ten neurotic children in Kerr's experiment, 15 correct identifications were made by the investigators. Contingency coefficients for various matchings in this study ranged from .86 to .96 (193).

— There are two disadvantages in the matching technique. The first, which is shared by all validation procedures which depend upon correspondence with a criterion, is the difficulty of selecting an adequate standard. The usual procedure is to match a projective protocol with case history material, or other test results, but as Harrison (153) and Macfarlane (8) note, the case history itself may be highly inaccurate. The second objection is the dependence of the matching results upon the skill of judges. The judge who matched five would appear to possess less insight than the judge who matched ten in the experiment mentioned above. A poor judge can lower the matching coefficient while *true* congruence in the materials themselves remains unaltered, but still unknown. Regardless of these drawbacks, if successful matching can be accomplished, some degree of correspondence can safely be assumed and further tested by more refined measures.

The criterion of internal consistency, as originally applied to such personality inventories as the Thurstone and others which followed, has been used to test the agreement of separate items in a battery of questions with the battery as a whole. This method has been criticized on the grounds that validity thus established seldom holds beyond the standardization group. The unity demonstrated is between the given question and the original list of questions

and does not constitute proof of coherence and "occurring-togetherness" of the traits themselves (254, p. 794).

In projective techniques, internal consistency applies to agreement found between results of assorted projective tests administered to the same subjects. But what constitutes *agreement*? The quotation from Frank cited above advocates this criterion; Allport lists it as one test for the validity of personal documents (209, p. 171); and Lerner and Murphy defend it as follows:

We aim for validity through comparison of a child with himself in different units of one and the same play situations in the nursery school and, insofar as possible at home. . . . The investigation of a few children, studied in this detailed fashion, can lead to as great or greater validity than large scale comparisons of so many children on a few ill-understood responses to *standard* stimuli (7, p. viii).

Although it seems reasonable to look for consistency within a person's performance in different situations, it must be recalled that true validity cannot be established through correspondence between measures which are not themselves validated. Even the conclusion that agreement offers evidence to support the theory that different tests measure the same thing (whatever it may be in the particular instance) calls for a warning sounded by Macfarlane. She points out that consistency may be a result of consistency in the experimenters' concepts, rather than between data themselves. (See discussion of this point in connection with reliability in an earlier section of this paper.)

Probably the soundest tests of validity are tests of predictive capacity. In several studies of validity, indices based on prediction have proved to be higher than the reliability of the same ratings. Cartwright and French (223), after reading several year's diary entries, attempted to predict the diarist's answers to certain tests and questionnaires. Results showed more agreement between predicted and actual answers, than between the two judges' predictions. A similar phenomena occurred when three experts made blind analyses of the Rorschach record of a single subject (115). Both Hertz (116) and Allport (209) explain the paradox as due to the fact that each analyst understood correctly different aspects of the personalities under inspection.

Prediction of actual behavior in concrete situations has not so far been attempted, if the designation *actual behavior* excludes responses to attitude tests (184, 199), prognosis in mental disease (124), or facts expected in the follow-up of cases (132, 153), and if *concrete* implies a particular stimulus setup. The possibility of suicide has been prognosticated from Rorschach records, the presence of hostile feelings and the likelihood of their overt expression has been noted, and numbers of similar motivational directions have been mapped and tested for individuals. It is not, however, possible to predict precise response sequences (Murray's *actones*, *verbones*, or *motones* [14]), since a diversity of acts may be equivalent for discharging the same drives in different individuals, and identical behavior may vary in motivation from person to person. Furthermore, a quantitative statement as to "how much" of a stimulus is needed to activate a tendency must remain relative rather than absolute.

Standardization. Progress toward the quantitative standardization of projective methods has been blocked not merely by the difficulties discussed above, but by a genuine distrust of the psychostatistical approach on the part of many. Allport illustrates the ludicrous results of what he terms "empiricism gone wild" by an example from one factor analyzed inventory which assigns a score of plus six on *loyalty to the gang* for the response *green* to the word *grass* (210, p. 329). Frank points out that statistical tests of reliability and validity

were originally devised to meet these problems in the absence of supplementary data (5, p. 400). Now that the latter are available, routine procedures should not be made a fetish to stand in the way of more effective, non-statistical techniques. Moreover, it has been claimed that *psychostatistical manipulations* and rigidly objective procedures are less applicable when carried over from the investigation of cognitive functions, such as intelligence, to the more affective aspects of total personality (154). *Paper and pencil* tests have come in for much unfavorable comment. Krugman describes them as having had "high reliability but practically no validity when the criterion of validity was not an artificially constructed one but agreement with other clinical data" (128, p. 100). Harrison describes the same measures as possessing strict objectivity and high reliability, but as "lacking in the one requirement of a good test and that unfortunately rather an essential one, validity" (154, p. 49).

As an alternative, many investigators hold to the belief that, instead of being content with relatively invalid, objective tests, the more difficult and important task of validating subjective methods should be attempted. Harrison states this aim and adds:

In the end it may turn out to be an easier task to objectify a plastic, subjective method which is based on sound principles, than to validate an objective test standardized along lines of test construction which have time and again proved unsuccessful (152, p. 122).

Munroe sounds the same note in discussing the possible standardization of her *inspection technique* for the Rorschach. That this would be possible is quite evident from her results, but Munroe sees the real issue as whether or not it would be desirable.

Such standardization by its very nature ignores the individual None of our present personality scales, including the Rorschach, if it were standardized in this manner, rest upon anything more than an empirical approximation. All our theories of personality are at variance with the notion that the summation of a series of items determined by discrete frequency tables could ever be expected to give an accurate dynamic picture of an individual (130, p. 233).

Criticisms and cautions. The opinion quoted so far in this survey has emanated almost entirely from within the frame of reference of projective techniques, rather than from the critical vantage point of a detached observer. What of the other side? What have the much criticized, even belittled adherents to traditional methodology in the personality field to say on the subject? Unfortunately, although there are many who disapprove the trend, projective methods have for the most part been "damned with faint praise" or simply ignored. Critics of the Rorschach, for example, are known to be numerous, but experimental refutations of claims made are practically non-existent. There is, in the literature, not one comprehensive critical review of projective methods by anyone outside the group of interested researchers. Does this mean that the advocates of newer approaches are attacking insensible straw men, or are they alive but inarticulate? Even the ESP research was for a time honored by highly vocal opposition.

Only two frankly critical articles can be cited. One was read by Balken at the 1941 meeting of the American Psychological Association (1). This paper, directed its attack chiefly at the lack of precision in the terminology used, and against what the author regarded as unjustified claims and interpretations but which she did not specifically illustrate. In further discussion of her paper

at a round table meeting, Balken expressed objections which appeared to be grounded in the belief that psychoanalysis has been insufficiently credited for underlying principles, and that its theories are being irresponsibly extended without sufficient knowledge of its basic implications.

Macfarlane (8) discusses the problems of standardization, reliability and validity, and adds two important cautions. The first relates to sampling. Clinicians, she warns, are "conspicuously subject to faulty over-generalization" and should be required to tabulate their own sample experience as a check against extending theories beyond the groups familiar to the investigator. She speaks of the *mushroom growth* of the methods, objects to their use by persons of sundry qualification or lack of it, and pleads that the inexperienced should be barred from this area of research, lest promising leads be bungled. Furthermore, she emphasizes the important and often neglected fact that all validation must rest upon the concepts and hypotheses underlying the research. Since there are as yet no universally accepted terms which do justice to the *richness and diversity* of personality, she suggests that an *articulated conceptualization* is basic.

It should become a part of the scientific mores in this pioneering, unstructured stage, that the first step in projective research should be an explicit statement of concepts used, and an orientation with respect to theoretical biases. Further, such a statement should appear on page one of any article instead of leaving it to the inference of the reader (8, p. 406).

Although projective methods can be and frequently are used for nomothetic as well as idiographic purposes, they are peculiarly well suited to the former; hence the controversy which rages about the single case study is an important related issue. John E. Anderson objects that the single case in physics in which the weight of factors is known in advance and controlled in order to design a crucial experiment, is not comparable to the single case in psychology in which there is no knowledge of the weight of factors and little or no possibility of control. This criticism, although pertinent in its emphasis upon the absence of crucial experimentation in the psychology of personality, appears to arise from a difference in fundamental premise. If we regard personality as an aggregate of parts, their action and interaction are obviously too complex for control. No matter how standardized the external situation, we cannot control the momentary inner state of the individual due to influences beyond our jurisdiction. If, on the other hand, we join the organismic personologists in regarding personality as a unified whole, then the person and not the part becomes the unit for study. This unit may be thought of as a construct, no more and no less directly observable than an atom. From this viewpoint it is feasible to control the immediate external conditions of experiment, and to study the composition of our *substance* (that elusive *inner state* or those *processes within* which baffle other procedures) through its effect upon something else, as in the physical experiments Frank describes. Exponents of the totalistic approach claim more logic and greater rigor in such method, than in attempts to set up elaborate control of conditions surrounding some arbitrary partial aspect of personality (such as a trait or an attitude) which is rendered distorted and meaningless by removal from the intrapersonal context.

Certain further disadvantages of projective methods have been noted by interested workers within the field. Some of the techniques, such as the *Tautophone*, are considered better suited to research than to clinical diagnosis because they are awkward, time consuming, and add little information which

could not be more efficiently obtained by a psychiatric interview (174). Harrison holds that, except for the Rorschach and the TAT which have been *partially validated*, most of the methods are *terra incognita* with validity and true value still to be demonstrated. "Others appear best suited for qualitative and interpretive work, and by their nature offer little opportunity for compromise with objective procedures" (154, p. 52).

EVALUATION

A review of the literature on projective methods shows first that they have a long and respectable lineage, with ties of kinship extending beyond the boundaries of psychology itself. Whether the offspring will grow into n'er do well dreamers, fulfilling the prophecies of conservative relatives, or will develop their originality in a maturity of scientific respectability, is a matter for the future to decide.

The theoretical issues will probably never be settled in an *either-or* fashion, since they represent philosophies of science which, in one shape or another, are as old as science itself. Psychology does well to be jealous of its painstaking empirical techniques, in spite of scoffers who hold that "the more exact methods generally yield the least information" (14, p. 547). On the other hand, if complex molar behavior and its hidden springs of action are not to be ignored, an open-minded attitude toward theory revision and toward innovations in method seems necessary. The admission of *explanatory theory*, combined with attempts to verify its constructs by experimentation, has been offered as one solution.

Bavink, the philosopher, has distinguished two types of theory: *elaborative theory* which contains practically no hypothetical elements since the fundamental assumptions are themselves data of experience; and *explanatory theory* in which "the unification of facts is only reached on the basis of a speculative assumption which is described as the hypothesis on which the theory is based," as in the atomic theory (215, p. 168).

Certain immediate issues seem more pseudo than real. Does standardization, for example, actually involve forsaking such important aspects as context and inter-relationships among variables? If so, perhaps it is reasonable to ask that it be postponed or even abandoned. Certainly normative data, inter-individual comparisons on single traits, and the search for uniformities should not be pursued exclusively at the expense of intensive individual studies of both the horizontal and vertical type. Interest in the methodology of personal documents and intensive projects such as the Harvard and Sarah Lawrence studies help to correct over-emphasis. But does the value of the new approach rule out the need for normative research as well? It would seem that the latter could at least provide orienting data which, properly used and interpreted, could furnish the clinician and student of personality with a stronger framework for his studies in inter-relationship.

A fact which is often overlooked both by those who scorn statistics and those who reify them is that numbers do not bestow precision but are, rather a convenient way to express it when it exists. Quantitative method might profitably be applied more extensively to the properties of the projective tests themselves. For example, as Harrison suggests (154), it would be valuable to have frequency tables similar to those for the Kent Rosanoff word association test, showing the relative frequency of certain common phantasies produced by each of the TAT pictures. If we think of these numerical results as adding to the precision of the instrument itself, instead of reading into the figures over-

simplified generalizations about people, no atomistic conception of personality is implied. The clinician would not need to alter either his theory or his interpretation of certain Rorschach syndromes if he also knew more about the frequency of the component determinants, both singly and in constellations. Such knowledge would, on the contrary, serve both as an added support and as a check on his conclusions.

Beck (103), Hertz (117) and others have developed tables showing the most commonly perceived forms on the Rorschach test. Zubin (139-141) has suggested a radical revision of Rorschach scoring to provide for more exact quantification. Common or *normal* details selected; forms frequently seen in the blots; as well as response determinants such as color, shading and movement have been intensively studied (106, 117, 118, 121, 124). Nothing comparable has been done for some of the other aspects of scoring, and rigid tests of various ratios used in interpretation have not been carried out. Other projective techniques are still more difficult to quantify and little or nothing has been done to develop workable scoring schemes.

Questions raised in regard to sampling are another issue which ought not to be insoluble. If projective methods are used to provide comparative data, Macfarlane's caution (see above) should be observed. For situations of this kind, the accepted rules of random sampling are sufficient, but it may be that we need supplementary principles to determine the adequacy of sampling in individual studies. An individual, as F. H. Allport has suggested (208) may also be regarded as a *population of events* and characteristics. What constitutes an adequate sample from an individual life. The validity of individual diagnosis and prediction might be increased by controls relating to the number of tests to be given, their distribution in time or under varying emotional conditions, the number of different observers needed, and so on. Some of these problems would be difficult to investigate, but with ingenuity should not be impossible to attack. For example, Tomkins' daily repetition of the TAT to determine the new thema limit (172), is one step in the direction of amassing data which might be used as a basis for individual sampling theory.

Recent advances in statistics have been little exploited in the quantitative treatment of results of projective experiments capable of expression in numbers whether derived from repeated observations on single individuals under systematically varied conditions, or from multivariable experiments involving exhaustive treatment of a small number of cases. Many authors are content to report their findings in percents without statements of significance. Small sample theory, including the techniques of analysis of variance and covariance have not been used to any extent in projective experimentation, although Brenman and Reichardt (109) have recently made use of Fisher's *t*-test to show the significance of differences in hypnotizability predicted from Rorschach records.

The advantage of these statistics, originally developed by Fisher in agricultural research and adapted to educational problems by Snedecor (264) and Lindquist (250), lies not in the unfortunate assumption that they offer a means for obtaining *significant* figures from scanty data or carelessly designed experiments. Instead, they avoid generalization beyond the data at hand by supplying a numerical means of expressing relationships found in a sample and of comparing these with results expected by chance in samples of the same size (250, p. 54). Moreover, the poorly designed experiment tends to defeat itself, since inadequate control of important variables results in large errors (*Within groups* variances) which reduce significance. Three advantages of the variance methods which seem especially promising as applied to projective experiments are as

follows: First, in the exploratory study in which a number of factors must be controlled, these can be handled simultaneously. Second, by the selection of cases to fit prescribed conditions, variables may be controlled without the laborious necessity of holding them constant. Finally, a measure of the amount and significance of variability due to the interaction of one or more variables, or to the effect of uncontrolled variables, is obtainable (232, 233).

For clinical psychology, which may be regarded as the applied branch of the psychology of personality, projective methods furnish one of the most promising hopes for a science of diagnosis and treatment. An experimental study by Davis (227) on the relative weight given to data from tests and from case histories in arriving at clinical judgments, found that clinicians are unwilling and unable to rely solely on objective criteria. Many believe that the final synthesis must forever rest upon the clinician's skill, experience, and "intuition," but the fact that these assets must be possessed and used does not relieve us of the responsibility of attempting at every turn to expand such subjective equipment by the development of scientific devices to supplement and check upon our conjectures.

Murray has remarked that psychology has the choice of two alternatives: to study important problems with as yet inadequate instruments, or to study with adequate instruments unimportant problems (15). Whatever their present status, the interest in projective procedures is evidence of an attempt to improve upon inadequate techniques, and evinces a constructive and hopeful preoccupation with method itself. There is a growing recognition that we must not be limited by narrow conceptions of what constitutes the scientific method, but instead must be on the watch for new approaches which conform to the broad aims of science, rather than to its dogmas (211). Historically, science arose in response to the need for knowing and dealing with the natural world, or in other words:

Science aims to give man an understanding, a power of prediction, and a power of control, beyond that which he can achieve through his own unaided common sense (209, p. 148).

If projective methods can be refined and safeguarded in order to serve that end, they deserve interested attention and exhaustive research. There appears to be considerable evidence that they may be well worth the expenditure of time and effort involved in thorough exploration.

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TEMPORARY CHAIRMEN AND SECRETARIES FOR PROPOSED APA DIVISIONS

ERNEST R. HILGARD

*Chairman, Division Organization Committee**

By vote at the annual meeting in September, 1944, a Division Organization Committee was appointed. This committee was instructed to name a temporary chairman and secretary for each of the charter divisions proposed in Article VII of the amended By-Laws.†

The list of temporary chairmen and secretaries as named by the committee follows. The officers of the divisions continuing other societies and the sections of the AAAP, not appointed by the committee on division organization, are also listed for the convenience of those who might wish to address communications to the temporary officers prior to the meeting of the Council of Representatives in September, 1945.

<i>Division</i>	<i>Chairman</i>	<i>Secretary</i>
1. General	R. M. Elliott University of Minnesota Minneapolis, Minn.	Edna Heidbreder Wellesley College Wellesley, Mass.
2. Teaching	H. S. Langfeld Princeton University Princeton, N. J.	Robert Leeper University of Oregon Eugene, Oregon
3. Theoretical-Experimental	E. C. Tolman University of California Berkeley 4, Calif.	K. W. Spence University of Iowa Iowa City, Iowa
4. Psychometric Society	Harold Gulliksen College Entrance Examination Board Princeton, N. J.	Harold A. Edgerton Ohio State University Columbus 10, Ohio
5. Evaluation-Measurement	L. L. Thurstone University of Chicago Chicago 37, Illinois	H. H. Remmers Purdue University Lafayette, Ind.
6. Physiological-Comparative	C. T. Morgan Harvard University Cambridge 38, Mass.	B. F. Skinner University of Minnesota Minneapolis, Minn.
7. Childhood-Adolescence	Harold E. Jones University of California Berkeley 4, Calif.	Florence L. Goodenough University of Minnesota Minneapolis, Minn.

* The members of the Division Organization Committee are: Horace B. English, Alvin C. Eurich, David Shakow, Robert M. Yerkes and Ernest R. Hilgard, chairman.

† *Psychological Bulletin*, 1944, Volume 41, page 768.

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<i>Division</i>	<i>Chairman</i>	<i>Secretary</i>
8. Personality-Social	Floyd Allport Syracuse University Syracuse, N. Y.	O. H. Mowrer P.O. Box 2605 Washington 13, D. C.
9. Society for the Psychological Study of Social Issues	E. R. Hilgard Stanford University Stanford Univ., Calif.	Daniel Katz Brooklyn College Brooklyn, N. Y.
10. Esthetics	C. C. Pratt Rutgers University New Brunswick, N. J.	C. L. Stone Dartmouth College Hanover, N. H.
11. Abnormal-Psychotherapy	F. L. Wells Harvard University Cambridge 38, Mass.	D. W. MacKinnon P.O. Box 2605 Washington 13, D. C.
12. Clinical	—	Frank Bakes University of Pennsylvania Philadelphia, Pa.
13. Consulting	Rose G. Anderson 522 Fifth Avenue New York, N. Y.	Emily Burr 1790 Broadway New York, N. Y.
14. Industrial-Business	C. L. Shartle Ohio State University Columbus 10, Ohio	—
15. Educational	H. E. Garrett Columbia University New York, N. Y.	Helen L. Koch University of Chicago Chicago, Ill.
16. School	W. W. Coxe State Education Dept. Albany, N. Y.	Wilda Mae Rosebrook Ohio State University Columbus 10, Ohio
17. Personnel	E. G. Williamson University of Minnesota Minneapolis, Minn.	Catharine C. Miles Yale University New Haven, Conn.
18. Psychologists in Public Service	C. L. Shartle Ohio State University Columbus 10, Ohio	Ruth Tolman 4420 Fiftieth St., N.W. Washington 16, D. C.
19. Military	C. M. Louttit Service Schools Command U.S.N.T.C. Bainbridge, Md.	William A. Hunt Bureau of Medicine and Surgery Navy Department Washington 25, D. C.

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These officers are responsible for the names which appeared on the nomination ballot mailed to the membership early in March. The temporary officers will serve until the elected officers take over their duties. The results of the nominating ballot will be incorporated into a final election ballot to be circulated about June 1, 1945. New officers will be announced and will assume office at the time of the Annual Meeting in September, 1945.

Another committee, the Committee on the Constitution, is preparing proposals for revision of the divisional structure to be submitted to the membership for vote. This committee consists of John E. Anderson, Alice I. Bryan, C. M. Louitt, Sidney L. Pressey, Willard L. Valentine, Lloyd N. Yepsen, and E. R. Hilgard (Chairman). In case the membership approves a revision of the divisional structure, the present divisional organization of 19 divisions may be considered a voting structure to produce a representative Council during the first year under the new By-Laws. The election of representatives in accordance with the present list of divisions does not commit the membership to continuing this particular divisional structure.

Both committees and the temporary officers will welcome communications from the membership regarding any matters of policy.

PSYCHOLOGY AND THE WAR

Edited by

DONALD G. MARQUIS

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PSYCHOLOGICAL SERVICES AT A NAVAL RETRAINING COMMAND*

LIEUT. COMDR. ROBERT J. LEWINSKI, H (S), USNR, AND
LIEUT. EDWARD J. GALWAY, H (S), USNR

The widespread and varied psychological services afforded during the present war have received considerable attention in professional journals during the past three years. That these services have been established and are presently operating among the various military organizations is evident by representative articles which have appeared on psychological functions in Army hospitals (13), mental hygiene units (2), air forces (14), rehabilitation centers (11), and specialized training units (4); in Naval hospitals (12), construction training centers (3), and training stations (6, 8); in the Coast Guard (1); and in the U. S. Maritime Service (10). The present paper is a discussion of the utilization of psychologists in a relatively new military activity, a Naval Retraining Command.

Under its Corrective Services Division, the Navy Department has established facilities exclusively for the rehabilitation of selected general court martial prisoners. Such an activity, known as a Retraining Command to distinguish it from a medical rehabilitation center, is designed to provide peno-correctional services typical of the country's more progressive correctional institutions, and is staffed by personnel qualified and experienced in penal administration. As the result of preliminary screening, prisoners are selected from the populations of Naval brigs, disciplinary barracks, and prisons on the basis of their inferred capacity for responding to rehabilitation and ultimate loyal service with the fleet. Characterizing this program is the emphasis placed on preparing the individual (retrainee) for sustained competent military service, and his response to this emphasis is the dominating criterion in measuring his adjustment.

An integral part of the retraining program is the Neuropsychiatric Clinic

* The opinions and assertions contained in this paper are those of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

which provides psychiatric and psychological services both routinely and upon specific request from other departments of the Command. Shortly after his arrival at the Camp, each retrainee is given a summary psychiatric examination so that those who present gross mental aberrations may be detected at the outset. At this time the psychiatrist may request psychological examination in questionable cases where additional clinical evaluation is desired. During this examination the psychiatrist usually makes a preliminary prognosis as to how each individual will adjust to the program. The results of this examination are made a part of the retrainee's record so that they will be available to those staff members who will work subsequently with the man.

During the first week of confinement all retrainees are given the Navy *General Classification Test* and the Navy *Mechanical Aptitude Test*. From the former test can be determined the individual's approximate intellectual level, although in cases where a suspiciously low score is obtained, the man is seen individually by the psychologist at which time a more thorough examination can be conducted. Since the General Classification Test is a group verbal examination, the scores are always interpreted with the inherent limitations of group tests in mind. Factors such as severe reading defects, which tend to lower group verbal test scores considerably, are carefully evaluated when final appraisal is made. The Mechanical Aptitude Test is administered so that the degree of each man's mechanical proficiency can be determined. These scores are utilized primarily in the correct vocational placement of the individual during his period of confinement, as will be pointed out subsequently. Both the General Classification Test and Mechanical Aptitude Test scores are incorporated in the record of the retrainee so that they may be referred to when necessary.

Individual psychological examinations are conducted in all instances where the man's General Classification Test score is so low that pronounced intellectual retardation is suspected. In those cases where the individual examination brings out the fact that the retrainee's mental level is higher than that indicated by the group test, owing to extraneous factors as reading defects, attention disturbances, etc., a note is made in his record so that the group test score will not be misinterpreted.

Among other sources of referral for psychological examination are the psychiatrist, the Educational Officer, the administrative command, and the Assignment Board, which will be discussed in detail later. The psychological examination includes not only the administration of a psychometric test, but an evaluation of the man's specific abilities and his potentialities for subsequent adjustment in the naval service. Attention is also directed to the emotional stability of the individual, and to those characteristics of personality which may prove to be liabilities when he is restored to active duty.

Because of the proximity in which the retrainees live, it has been found advisable to utilize not one, but several individual psychometric tests, so that the content will not become a matter of common knowledge. The *Kent Oral Emergency Test* (7) is frequently employed, especially in those cases where only a rough approximation of mental level is desired. The *Wechsler-Bellevue Adult Intelligence Scale* (16) is used in those instances where a more precise evaluation of intellectual ability is needed. The *Herring Revision of the Binet-Simon Test* (5), which has been previously described as a naval testing instrument (9), is also administered when circumstances permit the utilization of a highly verbal test. For variation, the *Stanford Revision of the Binet* (15) is occasionally used, although the length of time required to give this test precludes its frequent administration.

From time to time, during his period of retraining, each retrainee is seen by a psychiatrist or psychologist so that a check on his progress and adjustment to the program can be made. Such *progress notes* include observations on the man's attitudes toward the program and the service in general, his physical well-being, his immediate problems, his adjustment to the routine of the command, including any disciplinary action that has been taken against him, and those recommendations that the examiner wishes to make in his particular case. Shortly before a retrainee is to be considered for restoration to duty, a concluding *discharge note*, embracing the same factors covered in the progress note, is completed, so that a final psychiatric observation is available.

In those cases where a retrainee is considered by a member of the psychiatric staff to be a potentially deleterious influence on the program and/or unsuitable for restoration to active duty by reason of neuropsychiatric disorder, an informal *Neuropsychiatric Board of Review* is convened. This board, representing both psychiatric and psychological opinion, makes a thorough appraisal of the case, and recommendations for final disposition are made.

When preliminary studies are completed, the case is prepared for presentation to the Assignment Board, composed of representatives of all departments. The function of this board is to make appropriate industrial and educational placement, to arrange for the special social services indicated, and to classify the individual in terms of his ability respond to rehabilitation. On this board the psychologist, in addition to being a voting member, serves in an advisory capacity regarding pertinent psychological limitations and assets of the case and interprets previous clinical findings. Similarly, the neuropsychiatric point of view is represented on the Clemency and Restoration Board, a representative board convened to re-evaluate each case in terms of present readiness for restoration to duty.

Psychological opinion is frequently solicited in reference to policies involving rehabilitative techniques and in the evaluation of the program in general, as well as in matters involving the measurement of individual progress and adjustment. The psychologist is also called upon to make statistical surveys pertinent to the administration of the activity.

It has been shown that the psychologist at a Naval Retraining Command functions within the Neuropsychiatric Clinic and in relation to the whole activity in a role similar to that of the psychologist in the civilian peno-correctional institution. Basically, the major differentiation is that the military psychologist takes as his point of reference the individual's potentialities for adjustment to the unique conditions of war-time military service.

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EDUCATIONAL APTITUDE TESTING IN THE NAVY V-12 PROGRAM AT YALE

ALBERT B. CRAWFORD AND PAUL S. BURNHAM

Yale University

Educational aptitude tests, such as have been administered to all freshmen at Yale University for some years past, have also provided an excellent index of probable scholastic achievement for Navy V-12 students in the freshman year. That seems particularly true when achievement in college subjects is measured by the Navy's own objective achievement (screening) tests, which are usually given during the candidate's second freshman term. Except for history, these achievement test scores were as well (and in some instances even better) predicted by appropriate aptitude tests taken at the time of entrance, than by faculty grades reported at the respective first term's end. This is the most recent finding in research which for more than a decade has been conducted at Yale University in the construction and progressive revision of educational aptitude tests. Investigation along these lines, at both secondary school (10th to 12th grade) and college freshman levels, has involved the trial of many disparate measures—some adapted by permission from materials previously developed elsewhere, and others originated locally along novel lines.

An Educational Aptitude Test Battery of seven elements thus gradually evolved.* Since July 1942 six tests of differential, scholastic promise have been utilized; three drawn from the Yale Battery and three from materials (analogous to other sections of this Battery) specifically developed by the College Entrance Examination Board.† The several parts are currently designated as follows:

- 1) SAT —Verbal Factor (College Entrance Examination Board Scholastic Aptitude Test, Verbal Section).
- 2) VR —Verbal Reasoning (Test III of Yale Battery).
- 3) QR —Quantitative Reasoning (Test IV of Yale Battery).
- 4) MAT—Mathematical Aptitude Test (C.E.E.B. Scholastic Aptitude Test, Mathematical Section).
- 5) SV —Spatial Visualizing (C.E.E.B. Spatial Relations Test or analogous Test VI of Yale Battery).
- 6) MI —Mechanical Ingenuity (Text VII of Yale Battery).

Differential measures thus administered to entering freshmen, before or immediately following matriculation, are intended to serve as guides to their most suitable choice of an upper-class school or concentration area. Original scores are distributed in the usual manner and then converted into units of standard deviation from the class mean. The basic mean and standard deviation, to which final scores are anchored, is predetermined by the known per-

* For description of this Battery prior to 1942, see Crawford, A. B., Annual Reports of the Director, Department of Personnel Study, Yale University, New Haven, Connecticut, 1934-1935, 1938-1939, ff.

† College Entrance Examination Board tests (Verbal, Mathematical and Spatial) given to Navy freshmen at Yale at the opening of July 1943, November 1943, and March 1944 terms are designated by the C.E.E.B. as N. Y. 43. Their present counterpart is designated as S. V.-1.

formance of all entrants on the College Board Scholastic Aptitude Test. This procedure yields comparable indices throughout the entire battery. Resultant standard scores are reported in profile form to each student's counselor, and interpreted by him to the counselee in accordance with general instructions.

Correlations between respective test scores contributing to this battery and differential criteria as represented by civilian freshman grades in courses of variant nature, have been consistently promising. They have no less consistently been reduced, however, by certain "attenuating" influences, *viz.*, 1) *restriction in range* of test scores among groups electing certain courses; 2) *unequal scholastic motivation* among the students tested; 3) *disparate grading standards* among the various faculty departments, and even among instructors within the same department.

NAVY V-12 FRESHMAN CURRICULA

Through cooperation and interest of central Navy authorities and V-12 officers at Yale, it was arranged to administer essentially the same Educational Aptitude Battery as described above to all two-term V-12 entrants. *Two-term* means that the group in question did not include students transferred from other colleges to advanced standing; in other words, it consisted of true Navy freshmen, embarking at that collegiate level.

Individual test-profile forms were prepared in duplicate for each of these Navy freshmen. One copy was sent to the V-12 Administration Office and one to the Dean of Freshmen. These forms depict the student's relative (standard score) performance on each test throughout the battery as a whole, as compared with earlier-established civilian norms and those representing his own Navy group. They have proved especially useful by indicating where inadequate formal preparation, rather than lack of potential ability, at first handicapped certain entrants.

The first-year V-12 curriculum is prescribed and normally includes uniform courses in English, history, mathematics, mechanical drawing and descriptive geometry, naval organization and physics. Mathematics is offered at two levels, according to previous training. Chemistry replaces history for pre-medical students who numbered about two per cent of entering Navy freshmen. A few additional students whose previous preparation warranted it were permitted to substitute some other college course for one of the prescribed subjects. Many adjustments seemed desirable in mathematics. On the basis of early performance (high or low) certain students were shifted up or down from one level to another throughout the first term. Refresher courses and even special tutoring were provided to meet particular needs in some cases. Thus while the great body of Navy students pursued a uniform curriculum, there were some individual exceptions and these are reflected in the frequencies reported in the tables in this article.

Following the first term, certain achievement tests were administered to the Navy V-12 group. These tests were of the objective type and covered the following fields: English, physics, mathematics, and history (or chemistry for pre-meds). The College Entrance Examination Board (which had been commissioned by the Navy to prepare these achievement tests for use on a nation-wide basis) reported separate and total scores in terms of percentile standing among Navy V-12 students throughout the country.

FINDINGS

The present article deals with relationships obtained for V-12 freshmen between aptitude test scores and: (1) subsequent college grades (as reported by

Yale instructors); (2) Navy Achievement Test ratings. One of the most interesting findings is reported in Table I. Here data are presented showing the correlation between faculty grades and Navy Achievement Test scores.* The sig-

TABLE I

CORRELATIONS BETWEEN FACULTY GRADES AND NAVY OBJECTIVE ACHIEVEMENT
TEST SCORES FOR V-12 FRESHMEN ENTERING IN JULY 1943,
NOVEMBER 1943 AND MARCH 1944

<i>First Term Faculty Grades</i>	<i>Navy Achievement Tests (Normalized %ile Scores)</i>		<i>No. of Students</i>	<i>Correlation Coefficients</i>
General Average	Total Score	July Entrants	333	.67
		November Entrants	148	.59
		March Entrants	237	.66
English	English	July Entrants	328	.58
		November Entrants	148	.35
		March Entrants	218	.68
History	History	July Entrants	327	.61
		November Entrants	146	.59
		March Entrants	217	.60
Physics	Physics	July Entrants	333	.53
		November Entrants	151	.55
		March Entrants	235	.43
Mathematics	Mathematics	July Entrants	332	.49
		November Entrants	146	.64
		March Entrants	233	.62

nificance of these correlations is indicated when they are compared with those shown in Tables II and III. It is quite apparent that in general—with the exception of history—faculty grades did not correlate with achievement test scores so well as did aptitude tests. This is all the more significant when one considers that the aptitude tests were taken at matriculation—over four months previous to the achievement tests. Yet faculty grades were based on the work of the

* Elementary mathematics courses for Navy freshmen are designated by the numerals I and II for the first and second terms respectively. Similarly, advanced courses bear the designations III and IV. Courses in calculus are also available to a relatively small number of qualified Navy freshmen. Mathematics correlations reported in this study were based on the combined groups in mathematics I and III for the first term; II and IV in the second term. Coefficients were originally calculated for each of these groups separately but differences between them were not sufficiently large or consistent to warrant their being separately reproduced in the tables which follow.

In this and succeeding tables, supplementary data as to means and standard deviations of the various distributions have been omitted, since their inclusion would complicate presentation of the basic relationships to a majority of readers. These supplementary data are obtainable upon request to the Student Appointment Bureau, Drawer 1003A, Yale Station, New Haven, Connecticut.

TABLE II
APTITUDE TEST SCORES CORRELATED WITH FACULTY GRADES
IN V-12 FRESHMAN COURSES

Freshman Courses	Term and No. of Students	Aptitude Tests					
		I SAT	III VR	IV QR	V MAT	VI SV	VII MF*
<i>General Average</i>							
July Entrants	I 360	.44	.50	.56	.61	.31	.33
	II 301	.43	.46	.50	.55	.29	.38
Nov. Entrants	I 173	.28	.45	.53	.55	.30	.44
	II 162	.22	.31	.46	.46	.24	.35
March Entrants	I 269	.45	.52	.58	.63	.34	.42
	II 234	.40	.37	.48	.56	.26	.33
<i>English</i>							
July Entrants	I 353	.48	.47	.27	.32	.09	.01
	II 301	.46	.42	.03	.33	.39	-.01
Nov. Entrants	I 163	.37	.33	.11	.07	-.12	.06
	II 157	.42	.31	.02	.20	-.01	.02
March Entrants	I 247	.64	.54	.35	.37	.12	.16
	II 218	.58	.40	.26	.31	.02	.04
<i>History</i>							
July Entrants	I 353	.51	.46	.35	.40	.04	.12
	II 301	.50	.48	.33	.33	.01	.10
Nov. Entrants	I 163	.42	.41	.31	.28	.14	.14
	II 156	.43	.33	.21	.25	.03	.14
March Entrants	I 245	.52	.47	.41	.42	.08	.14
	II 217	.48	.37	.26	.27	-.01	-.02
<i>Physics</i>							
July Entrants	I 354	.37	.41	.49	.59	.25	.37
	II 301	.38	.42	.47	.53	.27	.33
Nov. Entrants	I 173	.25	.39	.48	.51	.25	.36
	II 161	.17	.22	.22	.31	.19	.33
March Entrants	I 266	.32	.46	.40	.44	.25	.31
	II 234	.29	.34	.46	.51	.26	.33
<i>Mathematics</i>							
July Entrants	I 329	.26	.37	.48	.52	.20	.18
	II 284	.23	.29	.39	.42	.24	.38
Nov. Entrants	I 159	.11	.33	.52	.53	.25	.38
	II 133	.11	.26	.50	.51	.22	.34
March Entrants	I 263	.32	.44	.55	.62	.25	.34
	II 164	.18	.18	.66	.44	.09	.24
<i>Engineering Drawing</i>							
July Entrants	I 354	.18	.22	.41	.36	.63	.50
	II 301	.19	.26	.40	.42	.51	.50
Nov. Entrants	I 163	.09	.22	.35	.26	.58	.45
	II 153	.04	.23	.39	.44	.47	.45
March Entrants	I 246	.11	.17	.39	.42	.56	.53
	II 185	.17	.24	.46	.52	.46	.46

* July 1943 entrants who had previously studied physics were required to take a Physics Achievement Test instead of the Yale Mechanical Ingenuity Test. Therefore the number of these students taking the Mechanical Ingenuity Test was 74 instead of 360. The Physics Achievement Test proved to be of limited value in this situation and was subsequently discontinued.

whole term, and were reported only some weeks before administration of the achievement tests.

Table II shows correlations between aptitude test scores and college grades in the V-12 program. It compares first and second term data for the groups entering in July 1943, November 1943 and March 1944. The coefficients in certain sections have been printed in boldface to indicate particularly appropriate relationships. For instance, the College Board SAT correlated better with English and history than with less obviously related subjects—physics, mathematics, and engineering drawing. Similarly, the Yale Quantitative Reasoning and the College Board MAT agreed better with performance in physics and mathematics than did other tests. College Board Spatial Visualizing and Yale Mechanical Ingenuity Test correlations with freshman grades in engineering drawing were encouragingly high. Accompanying *low* correspondence between certain aptitude tests and *inappropriate* criteria (for example, between College Board SAT and mathematics or engineering drawing grades) are no less interesting in a differential sense, and evidence the generally discriminating nature of this battery. Perhaps the most striking feature throughout Table II is the consistency of its pattern, as a correlation matrix.

Aptitude tests which correlated best with general average of all subjects in the V-12 freshman curriculum were: Quantitative Reasoning and College Board MAT. This finding doubtless partially reflects the extent to which physics and mathematics contributed heavily to the general average for each Navy student. Second term correlations were, with some exceptions, slightly lower than corresponding ones for the first term. This is probably owing to the higher degree of selection in the second term population, since some of the less able students had been eliminated earlier in the year.

Correlations for the November group were in many instances a bit lower than for the July and March entrants. Corresponding differences are not great, to be sure, nor entirely consistent. November entrants were slightly inferior to July entrants in general level of test scores and somewhat more homogeneous or restricted in range, particularly with respect to SAT, VR and MAT scores. However, as noted above, the *general pattern* among these relationships has tended to persist with considerable stability, not only for successive entering groups but from first to second terms for each group.

Although the chief purpose of a differential aptitude battery is to provide separate measures of individual promise for disparate fields, correlations between the several tests and average classroom grades in general are also interesting. The two quantitative tests (Quantitative Reasoning and Mathematical Aptitude) naturally yielded the highest coefficients in this respect, partly because the V-12 curriculum placed most stress upon physics and mathematics. Out of 24 total contact hours, 11 were devoted to physics and mathematics.

Conspicuously *low* relationship between the Spatial Visualizing and Mechanical Ingenuity Tests, and *all other courses than engineering drawing* (with which they correlated well) is quite in accord with expectations. Previous trial of many such three-dimensional visualizing and mechanical insight measures at Yale, among successive (civilian) entrants, has consistently indicated their unique value in this sense. No other educational aptitude seems, at college-preparatory or freshman levels, better differentiated than the Spatial factor (in which we include the dynamic aspects represented by Test VII of the Yale Battery). Its significance, though of restricted nature, is nevertheless outstanding within this particular area; well-constructed Spatial Relations and Mechanical Ingenuity tests offer the best indices of promise for engineering (mechanical) drawing and descriptive geometry. These subjects may also be considered as of

restricted nature, but they have long been definite pre-engineering requirements and are no less so in the V-12 curriculum.

Correlations with Navy Achievement Tests. Table III shows first term data for July, November and March entrants respectively. The correlations are between College Board or Yale Aptitude, and Navy Achievement Test scores. Coefficients for appropriate criteria were without exception higher than corresponding values in Table II. Whatever may be the reasons for this, it is likely that increased reliability of the achievement tests and sheer test-taking ability (discussed later in this study) were important factors. In practical terms, this simply means that aptitude tests did a superior job of forecasting probable scholastic achievement when the latter was reliably measured by objective tests. But there are other important values which these objective tests may *not* have appraised; these are largely personal, and their evaluation subjective in nature. For example, the Navy Achievement Tests probably did not provide adequate scope for clarity in free expression; originality; or independent, logical organization of study-materials. Cooperativeness and consistency of performance in class were not necessarily measured; nor persistence in overcoming obstacles. These factors and many others in addition to "having the right answer" may have entered quite properly into the instructor's grading process, represented in the preceding table, as compared with that which follows.

The same general pattern of appropriate relationships between aptitude and achievement tests holds in Table III, as with courses of study in Table II. The College Board SAT and the Yale Verbal Reasoning Test correlated highly with English and well with history. In fact, their correspondence with English Achievement Test scores ranged between .65 and .83. High indices were also found when the Yale Quantitative Reasoning Test and the College Board MAT were compared with Navy Achievement Test scores in mathematics, and to a lesser but still impressive degree with physics. The Yale Mechanical Ingenuity Test also correlated well with the latter criterion. Unfortunately, the Navy Achievement series did not include a test of mechanical drawing and descriptive geometry; hence no suitable index for validation (by objective materials) of the Spatial Test was provided.

The College Board SAT (Verbal Section) agreed quite well with total scores on the achievement tests, and in this respect proved of approximately equal value as the Verbal Reasoning, Quantitative Reasoning and College Board MAT. There are probably two reasons why the SAT and Verbal Reasoning Test correlated better with total achievement test scores than with freshman general averages. The first is higher reliability of total achievement test scores than of general averages. Second is that total achievement test scores were based on controlled weighting of objective test scores in English, history, physics, and mathematics. Because of varying ranges of grades used in assigning marks in the Navy freshman courses in English, history, physics, and mathematics, the weighting was relatively uncontrolled. As a result the contribution of English to the general average was submerged by the greater influence of physics and mathematics. This condition arose largely from the very unequal "spread" of grades among these several courses.

In general terms, it may be stated that the Yale V-12 group as a whole scored well above the Navy's country-wide norm on the achievement tests. A locally skewed distribution (with the upper half packed within roughly the top third of national percentiles and the lower half spreading much more widely downwards) resulted on separate and total achievement test scores alike. As earlier noted, the Navy Achievement Examination did not include a mechanical

TABLE III
APTITUDE TEST SCORES CORRELATED WITH ACHIEVEMENT
TEST SCORES IN V-12 FRESHMAN COURSES
(JULY 1943, NOVEMBER 1943 AND MARCH 1944 ENTRANTS COMPARED)

Navy Achievement Tests Taken at End of Term I (Normalised %ile Basis)	No. of Students	Aptitude Tests					
		I SAT	III VR	IV QR	V MAT	VI SV	VII MT*
<i>Total Score</i>							
July Entrants	335	.67	.66	.66	.71	.27	.52
November Entrants	155	.63	.68	.62	.68	.23	.52
March Entrants	235	.69	.68	.62	.70	.33	.51
<i>English</i>							
July Entrants	335	.79	.69	.46	.45	.14	.41
November Entrants	155	.75	.65	.47	.46	.09	.33
March Entrants	235	.83	.69	.50	.44	.14	.31
<i>History</i>							
July Entrants	329	.60	.51	.38	.43	.04	.31
November Entrants	149	.61	.51	.27	.32	.07	.25
March Entrants	235	.45	.41	.26	.34	.16	.25
<i>Physics</i>							
July Entrants	335	.34	.45	.53	.58	.31	.52
November Entrants	155	.37	.48	.48	.56	.38	.67
March Entrants	235	.37	.48	.46	.61	.39	.59
<i>Mathematics</i>							
July Entrants	310	.37	.47	.65	.74	.33	.34
November Entrants	132	.16	.41	.54	.68	.16	.41
March Entrants	235	.34	.42	.61	.74	.39	.47

* See Table II footnote.

drawing section, so objective scores in that subject were not available. Since the naval organization course required but one contact hour per week, data thereon were not obtained.

Before correlating reported percentile ranks with any other scores, it was necessary to normalize the percentile distributions. At a later date it became possible to secure from the College Board raw scores for the July population. Correlations based on these raw scores were found to be almost identical with those derived from normalized percentile scores. Achievement test data reported herein (Tables I and III) were derived from normalized percentile scores.

FACILITY IN TAKING OBJECTIVE TESTS

It has been noted earlier in this study that relationships between objective measures (i.e., Yale Aptitude and Navy Achievement Tests) generally exceeded those between aptitude tests and the more subjectively determined classroom

grades. Substantial differences prevailing may reflect, at least in part, the influence of *test-taking ability*—a combination of response-speed, facility in manipulating and marking separate answer sheets, or a knack for multiple-choice questions. If so, these coefficients have to some extent been spuriously raised by a general factor operating in *both* objective-test situations and not really germane to the particular measures themselves, which were intended to be differential. This argument is strongly supported by the quite high correlations obtained for verbal and quantitative tests alike, with total Navy Achievement scores. Nevertheless, extensive variations occur throughout Tables II and III, in successive correlations of aptitude tests with *specifically appropriate versus inappropriate criteria*. This is true, whether the latter represent classroom grades or achievement-test ratings in specific fields.

SOME ADVANTAGES OF A UNIFORM CURRICULUM

The V-12 program has provided means for evaluating the effectiveness of educational aptitude tests under a quite favorable environment. To recall the attenuating influences mentioned previously:

1. Since all Basic V-12 two-term freshmen (with the few exceptions already mentioned) pursue a uniform curriculum, there can be no *variation in range* of the test scores among elective sub-groups. This presents a unique advantage for evaluating the effectiveness of prognostic tests.*
2. *Motivation* generally is high among V-12 students, because those who make a good record can definitely look forward to Midshipman School, leading in turn to a commission. There are some individual exceptions, notably among men detached from active training units in order to fill Fleet and Marine Corps college quotas from the enlisted ranks, who prefer to get back with their previous buddies. Yet the great majority do their best to qualify, in the classroom and otherwise, as officer candidates.
3. *Disparate standards of grading* still exist throughout various institutions administering this *same* V-12 curriculum and even among different departments within a single institution.** However, the Navy's own *screening* achievement tests yield objective measures of performance standardized on a nation-wide, though selected population.

FORECASTING TOTAL SCORE ON NAVY ACHIEVEMENT TESTS

A best-weighted combination of four aptitude tests was developed to form a *prediction* of general scholastic achievement in Term I. Data for determining choice of tests and weights comprising it were based on July 1943 entrants. The formula thus derived was applied in November to Navy students entering at that time. Correlation of this prediction with total score on achievement tests

* The writers hasten to add that, whether or not such curricular uniformity is justifiable in a service training situation, they cannot regard it as desirable for general education. It provides, temporarily, certain experimental controls which may be utilized to advantage in psychometric research; but even furtherance of the latter can hardly be preferred to the recognition and appropriate cultivation of *individual differences*.

** The writers have no direct knowledge of, or access to, complete records in this respect. Scores made by Yale V-12 candidates on the several Navy Achievement (screening) Tests of 1943 and 1944 reflect considerable variation throughout different areas. Since the Yale group average has consistently ranked within the Navy's top third on these tests, it is clear that institutional variations must also be extensive.

taken the following March proved to be .75 ($n=155$). The same formula, applied to the next group when it entered in March 1944, yielded a prediction correlating .74 ($n=235$) with total score on the achievement tests of July 1944. This multiple prediction formula was based on the following tests: Yale Verbal Reasoning Test, Yale Quantitative Reasoning Test, College Board Mathematical Aptitude Test and College Board Spatial Relations Test.

SUMMARY AND CONCLUSIONS

The major findings in this study may be stated briefly as follows:

1. The pattern of differential relationships between educational aptitude tests (of the type employed at Yale University for some years in educational guidance) and course grades of civilian students, has been strongly confirmed by data obtained from Navy freshmen.
2. Correlations reported in this study are in general higher than those previously reported for civilian students. This appears to be due to control of certain attenuating factors commonly operating in civilian curricula which are largely eliminated by the Navy's prescribed program. Hence the foregoing correlations probably better represent the true discriminating power of educational aptitude tests than do those previously obtained with civilians.
3. This differential aptitude pattern, established for the Navy group, tended to persist from one class to the next and from one term to the next.
4. Aptitude tests have proved to be particularly effective forecasters of academic work when the latter was measured by objective achievement tests.
5. Educational aptitude test scores at the beginning of the term generally predicted subsequent achievement test rank as well or better, than did faculty grades at the end of the term.
6. Achievement test correlations based on raw scores were almost identical with analogous correlations based on normalized percentile scores.
7. Multiple regression forecasts developed from a group of four aptitude tests correlated .74 to .75 with subsequently measured total achievement.

In conclusion it may be stated that a differential educational aptitude test battery provided counseling material of equal value for Navy V-12 freshmen, as for civilians. It is hoped that studies such as the present one, and others made elsewhere, may help point the way to improved practices in selection and individual guidance. The data presented above also suggest means of assisting civilian students and returning service men alike, to profit increasingly from their educational opportunities.

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RACIAL AND BI-LINGUAL GROUP DIFFERENCES IN PREDICTABILITY AND IN MEAN APTITUDE TEST SCORES IN AN ARMY SPECIAL TRAINING CENTER*

WILLIAM D. ALTUS, 1ST LT., AGD

Senior Personnel Consultant

*Ninth Service Command Special Training Center
Camp McQuaide, California*

The diverse objectives of an Army Special Training Center have been previously described by Bell and Altus (2). In brief, the main, though by no means the sole, function of such a Center is to ensure that the soldiers shipped therefrom have attained an efficiency in reading and number work which approximates that of the fourth-grade level in the public school. If the trainee fails to reach this level within twelve weeks, he is discharged as inapt, unless, as infrequently is the case, he has an occupational specialty which would make him valuable to the Army even though he were technically illiterate.

Owing to the criteria for entrance into a Training Center and for graduation therefrom, group differences may easily be studied with the knowledge that certain factors are automatically controlled. The criteria for entering such a unit are the same for everyone:

1. A soldier must be technically illiterate, as defined by the literacy test used in Induction Stations, and he must have passed the performance tests used for screening out the dullest of the illiterates;
2. If he is non-English and for that reason illiterate in English, he is also sent to a Training Center if he successfully passes the performance screening tests, even though he may be literate in his native language;
3. A soldier who is found to be literate at the Induction Station is also sent to such a Center if he falls into Grade V (standard score of 59 or less) on the Army General Classification Test.

The tests used for placement in various levels for instructional purposes, the promotional tests and the graduation tests are all constant for every trainee. If he fails to meet the graduation standards, the trainee is discharged as inapt; if he graduates, he is shipped to a Replacement Training Center to continue the basic training to which he has been partly inured at a Special Training Center. The dichotomous disposition of the trainee permits the validation of any testing device through the bi-serial correlation method. This type of validation has been reported for the subtests of the Wechsler Mental Ability Scale, Form B, by Altus (1).

The correlational (bi-serial) validities of the Wechsler subtests were found to be relatively high for the nearly two thousand cases used in the study (1). The narrow range of general aptitude among the trainees and the necessarily restricted reliability of the single subtests which comprise the mental ability

* The opinions expressed in this article are those of the author and are not to be construed as reflecting the official attitude of the Army of the United States.

† 2d Lt. Ephraim Yohannan, T/4 Roy Burge, Pfc Sidney Feinberg, Sgt. Carl Karasek and T/5 Grant Smith are to be credited with tabulating the data presented in this article. Credit is also due T/4 Edmund Ellis for most of the statistical work involved in the study.

scale attenuated the coefficients, no doubt, so that the term "relatively high" in reference to their validating coefficients is used advisedly. The bi-serial correlation of the Arithmetic subtest of the Wechsler Mental Ability Scale, Form B, with the disposition of the trainee was .467; for the Information subtest, it was .406; Comprehension, .360; Similarities, .334. The four performance subtests, which are given the non-English trainees, showed even higher validity (1).

Thus, it was known that the Wechsler Scale was valid for the Center as a whole, but the question of its validity for the various racial and bi-lingual groups comprised in the Center was still unanswered. The four verbal subtests mentioned in the preceding paragraph are given to all trainees who are conversant enough with English to understand the questions found in the subtests. Since most of the trainees have been tested on the verbal subtests of the Wechsler, these are the ones used for validation purposes in this study rather than the performance tests, which were given to the non-English trainee only.

There are sufficient numbers of Colored trainees and of native-born White trainees of *old-line* American stock who had been disposed of to ensure reliability in the data. There were also numbers of trainees of Mexican ancestry who were bi-lingual, speaking both Spanish and English. More than two hundred American Indians who were mainly bi-lingual had also been disposed of at the time of this study. Somewhat over half of these were *reservation* Indians from Arizona; the others, deriving mainly from the Coastal areas, lived for the most part in the various White communities. In addition to the bi-lingual Mexicans and Indians, there were approximately fifty Chinese and fifty Filipinos who understood English sufficiently well to take the Wechsler Verbal, even though they had not been born in this country. Since the numbers of Whites, Colored and Mexican were greater than was necessary for this study, only 400 of each of these groups were used. For the other three groups, all those who were English speaking and who had been disposed of at the time of this study were included.

Table I presents data on the six different groups: the number of cases involved in each group on each subtest, the mean score and its sigma, the bi-serial correlation of the subtest with the disposition of the trainee and the probable error of the bi-serial correlation. It will be noted that the highest bi-serial correlation in this table is for the Chinese group on the Similarities subtest of the Wechsler, .708. The highest average set of correlations, however, when all four subtests are considered, belongs to the Colored. Three of the bi-serials for this group are in the .50's. The Indian shows the next highest set of validity coefficients. One of his r 's is in the .50's, two are between .49 and .50 and one is nearly .40. If it were not for the Arithmetic subtest, which shows no validity whatever for him, the Filipino would have been second in average validity. As it is, the White, the Filipino and the Chinese have roughly the same order of association with the four Wechsler subtests. The least order of association is found for the bi-lingual trainee of Mexican ancestry.

As in the study of the total group of trainees (1), the Arithmetic subtest has the highest validity for the set criterion of disposition. For the three largest groups, White, Colored and Mexican, Arithmetic has the highest order of association; it is second best for the Indian but is of little value for the Filipino and for the Chinese. The Information subtest is second best for the White, Colored, Indian and Filipino; it is third in order of association for the Chinese, and for the Mexican it is the least effective of all the subtests. Similarities has the highest order of association for the Chinese (.708); while for the Mexican it is second; it is third for the White, Indian and Filipino but takes last place for the Colored. The Comprehension subtest has second place for the Mexican,

TABLE I
THE PERFORMANCE OF CERTAIN RACIAL OR LANGUAGE GROUPS
IN AN ASTC ON FOUR VERBAL SUBTESTS OF THE
WECHSLER MENTAL ABILITY SCALE

Subtest	N	Mean	σ_{Mean}	r_{bis} Discharge vs. Graduation	P.E. _{r_{bis}}
<i>White*</i>					
Information	400	5.97	1.86	.425	.039
Arithmetic	400	5.32	2.10	.450	.038
Similarities	400	6.37	1.82	.379	.040
Comprehension	400	5.00	2.33	.340	.041
<i>Colored</i>					
Information	400	5.44	1.82	.557	.035
Arithmetic	400	5.31	2.13	.578	.035
Similarities	400	6.02	1.78	.388	.041
Comprehension	400	4.37	2.36	.515	.037
<i>Mexican†</i>					
Information	400	4.28	1.73	.293	.045
Arithmetic	400	5.24	2.14	.417	.042
Similarities	400	5.56	1.99	.321	.044
Comprehension	400	3.73	2.02	.339	.044
<i>Indian</i>					
Information	209	3.49	1.78	.534	.055
Arithmetic	209	4.00	2.25	.498	.057
Similarities	209	3.71	2.38	.494	.057
Comprehension	209	2.10	2.04	.397	.061
<i>Filipino</i>					
Information	52	4.46	1.56	.557	.123
Arithmetic	52	5.02	1.26	.008	.152
Similarities	52	4.08	2.33	.446	.135
Comprehension	52	3.38	2.33	.565	.122
<i>Chinese</i>					
Information	51	4.12	1.79	.364	.122
Arithmetic	51	7.08	2.34	.148	.133
Similarities	51	3.82	2.42	.708	.088
Comprehension	51	3.25	2.47	.417	.119

* Native-born, *old-line* American stock.

† Of Mexican ancestry, whether a citizen of the United States or not.

Filipino and Chinese, is third for the Colored and is least valid for the White and the Indian.

It is apparent that from their average order of association, the validity of

the subtests of the Wechsler are exactly the same as they were in the previous study (1). Within the groups of this study, however, there are some marked differences. For those trainees who were born in the United States, the Information and Arithmetic subtests are generally superior. The items in these tests require more specificity in their answers than do the more abstract and *reasoning* items found in Similarities and Comprehension. But for the Chinese and Filipino (who were generally not born in the United States), the abstract *reasoning* items are more valid for predicting the type of disposition the trainee will receive. The possible implications of these data will be discussed in a later section.

Table II gives two types of data:

1. The chances of a true difference in the order of association value with the criterion of the various subtests for the same racial or bi-lingual group;
2. The chances of a true difference in the order of association value for the same subtest for different groups.

In the first category, it will be noted that there are 91 chances out of 100 that the Arithmetic subtest is significantly more valid for the White trainee than is the Comprehension subtest. For the Colored there are 99 chances out of 100 that the Arithmetic test is more valid than the Similarities test. There are roughly nine chances out of ten that the Arithmetic is also more valid for the Mexican than is the Information test. For the Indian, Information is probably

TABLE II
THE DIFFERENCE IN BI-SERIAL CORRELATION ON FOUR VERBAL SUBTESTS
OF THE WECHSLER MENTAL ABILITY SCALE, DIVIDED BY THE P. E.
OF THAT DIFFERENCE FOR CERTAIN LANGUAGE AND
RACIAL GROUPS IN AN ASTC

<i>Subtest</i>	<i>Group</i>	$\frac{D}{P.E.D}$	<i>Chances in 100 of a True Difference</i>
Arithmetic vs. Comprehension	White	1.98*	91
Arithmetic vs. Similarities	Colored	3.52*	99
Arithmetic vs. Information	Mexican	2.00*	91
Information vs. Comprehension	Indian	1.67*	87
Arithmetic vs.			
1) Information	Filipino	2.81*	97
2) Comprehension	Filipino	2.86*	97
Arithmetic vs. Similarities	Chinese	3.52*	99
Information	Colored vs. Mexican	4.63†	100
Arithmetic	Colored vs. Filipino	3.65†	99
Similarities	Chinese vs. Mexican	3.93†	100
Comprehension	White vs.		
	1) Filipino	1.74†	88
	2) Colored	3.12†	98

* Same group compared on different subtests.

† Different groups compared on the same subtest.

more valid than Comprehension; there are 87 chances out of 100 of a true difference. For the Filipino, there are 97 chances out of 100 that both Information and Comprehension are more valid than is Arithmetic. There are 99 chances out of 100 of a true difference in the order of association value of Similarities compared with Arithmetic for the Chinese, Similarities in this instance being the more valid.

The difference in bi-serial correlation of Information for the Colored, compared with the Mexican, is significant, $Dif./P.E.Dif.$ being 4.63 in favor of the higher association for the Colored trainee. There are also 99 chances in 100 of a true difference in validity favoring the Colored over the Filipino for the Arithmetic subtest. Almost fully significant statistically ($Dif. in r_{bis}/P.E.Dif.$ of 3.93) is the high validity of Similarities for the Chinese compared with the Mexican. There is a fair probability (88 in 100) that Comprehension is more valid for the Filipino than for the White; it is even more likely that the same test is better for the Colored (98 in 100) than for the White.

Table II presents statistically what has been mentioned before concerning the type of subtest best suited for certain groups of trainees. Comprehension

TABLE III

THE DIFFERENCE IN MEAN SCORES ON FOUR VERBAL SUBTESTS OF THE
WECHSLER MENTAL ABILITY SCALE, DIVIDED BY THE S. E. OF THAT
DIFFERENCE FOR CERTAIN LANGUAGE AND RACIAL
GROUPS IN AN ASTC

<i>Group</i>	<i>White</i>	<i>Colored</i>	<i>Mexican</i>	<i>Indian</i>	<i>Filipino</i>
<i>Information</i>					
Colored	4.08				
Mexican	13.00	9.21			
Indian	16.00	12.83	5.19		
Filipino	6.37	4.17	.77	3.90	
Chinese	6.98	4.96	.60	2.26	1.02
<i>Arithmetic</i>					
Colored	.07				
Mexican	.54	.47			
Indian	7.17	7.01	6.63		
Filipino	1.46	1.41	1.07	4.34	
Chinese	5.10	5.13	5.33	8.48	5.52
<i>Similarities</i>					
Colored	2.78				
Mexican	6.04	3.43			
Indian	14.22	12.35	9.64		
Filipino	6.24	5.79	4.38	1.02	
Chinese	7.26	6.27	4.92	.29	.56
<i>Comprehension</i>					
Colored	3.77				
Mexican	8.19	4.13			
Indian	15.76	12.34	9.42		
Filipino	4.71	2.88	1.04	3.66	
Chinese	4.78	3.06	1.33	3.24	.28

and Similarities are more valid for those born outside the United States, compared with those born here. Conversely, it is generally true that the Arithmetic and Information type of test is better for the American born. There is also some evidence (leaving out the Indian) that Arithmetic and Information are somewhat better for the monoglot (White and Colored) than for the bi-lingual groups. Only one of the twelve differences in Table II, however, reaches certainty; the remaining eleven, while fairly high in some instances, do not have critical ratios in which full confidence can be placed.

In Table III are presented data concerning the significance of the differences in mean scores of the various groups on each of the subtests. The Whites are significantly superior to all other groups on Information. The Colored trainees are significantly superior in mean score to all other groupings with the exception of the Whites. The Mexican is significantly superior to the Indian, slightly superior to the Chinese, somewhat inferior to the Filipino. The Chinese have a mean score that is inferior to all the other groups, excepting the Indian; there are 99 chances out of 100 that their mean score is significantly higher than for the Indian, however.

There are only minor and statistically insignificant differences in the mean scores of White, Colored and Mexican trainees on the Arithmetic subtest. The Chinese have a mean score on this test which is significantly higher than that of any other group. The Indian is statistically inferior in his mean score to all other groups. The differences among the four other groups—the White, the Colored, the Filipino and the Mexican—are not significant from the statistical standpoint.

On the Similarities subtest, the Whites are superior to all other groups, excepting, perhaps, the Colored; even here the chances are 399 to one that a true difference favoring the White does exist. Similarly, with the exception of the White group, the Colored is superior to all others. In turn, the Mexican is significantly superior to the Chinese, Filipino and the Indian. The differences in the means of the three last-named sub-groups are not significant. The Filipino is, however, somewhat superior to the Indian, and there are 84 chances out of 100 that there is a true difference.

The White trainee is significantly superior to all the other trainee groups on the Comprehension subtest, while the Colored trainee has a significantly higher mean score than do the Indian, the Mexican, and the Chinese. There are about 499 chances out of 500 that the Colored are likewise superior on this one test variable to the Filipino. The difference between the mean scores of the Filipino and the Chinese is of no consequence; both groups, however, are significantly superior to the Indian, who is inferior to all the other groups.

Table III proves that in mean test scores on certain verbal subtests of the Wechsler Mental Ability Scale, Form B, there are striking and significant differences among some of the racial and linguistic groupings in the Ninth Service Command Special Training Center. The White group is definitely superior to all of the others, while the Colored trainee assuredly earns second place. The Mexican is third in order. There is little difference between the Chinese and the Filipino, except for the very striking superiority of the former on the Arithmetic subtest. The Indian is significantly lower than any of the other groups studied.

It will be remembered that there were fewer significant differences in mean scores on the Arithmetic test than for any of the other subtests. The most likely explanation for the greater homogeneity in mean scores on this test variable is that it is relatively freer of cultural influences than are the other tests. If this

explanation has some validity, one should expect that the test showing the greatest amount of group divergencies in mean scores would be on the Information subtest, which contains a few questions definitely predicated upon a knowledge of American culture. This appears to be a true inference, for there are greater differences between the mean scores of the monolingual White and Colored trainees and those of the bi-lingual trainees than for any other subtest.

It may also be inferred from the data in Table III that the difficulty of any subtest for the trainees has little relation to its validity, as validity is defined in this article. Generally, the Arithmetic subtest was quite easy for all Chinese but it did not discriminate between those who were discharged as inapt and those who were graduated. It may also be noted that while the White trainee has the highest scores on most of the subtests, he is certainly not the most predictable. Conversely, the Indian, who is definitely inferior in average score to all the other groups, is second in predictability only to the Colored trainee.

It was noted by Altus (1) that the test-retest reliability of the Arithmetic subtest was the lowest of all the four verbal subtests in use at this Center. This test also has the highest order of association with the disposition of the trainee. Thus, it seems that neither the reliability nor the difficulty of a group of items is necessarily reflected in its validity. Rather, one should probably say that such a condition is true of four of the verbal subtests of the Wechsler Mental Ability Scale for trainees in a Special Training Center when the criterion is the disposition of the trainee. No further generalization should be made.

The significance of the differences of the variability of scores of the groups on the several subtests is given in Table IV. It will be noticed that the Filipinos have a smaller sigma than do the Whites on the Information subtest. There are 24 chances in 25 that this difference in sigma size is significant. The sigma of the Filipinos on the Arithmetic subtest is significantly smaller than the sigma of any other of the groups on the same test. The Colored trainees are found to be significantly less variable in score on Similarities than are the Indians; also there are 99 chances in 100 that the Colored are less variable than the Chinese. On Comprehension, however, the Colored have a significantly larger sigma than does the Mexican.

In the lower part of the table is shown the significance of the size of the sigmas for the several groups on the four subtests—for instance, the size of the Indian's sigma for the Information subtest as compared with his sigma on the Similarities test. Six of the differences involving the Information subtest sigmas are significant; three of them are very close to statistical significance. In each of the nine instances, the sigma of the Information subtest is smaller than the one with which it is compared. In three comparisons, the sigmas of Arithmetic are significantly larger than the sigmas for three other subtests taken by the same racial group; in one other instance it almost reaches significance with a C.R. of 2.83. For the White and the Colored, there are reliable differences between the size of the sigmas of the Comprehension and Similarities subtests, favoring greater dispersion for scores on the former test.

Not much is to be gained by the type of comparison noted in the preceding paragraph, however. In the previous article by Altus (1), it was shown that standard scores in which the Wechsler subtests are couched are not at all comparable for the group of restricted mentality which is the subject of the present study. When subjects of low general capacity are tested, it appears that the equivalence of standard scores, which may have meaning for a group whose capacity extends through the full testable range, breaks down, so that similar scores on two different subtests may not be regarded as equal. A like criticism

TABLE IV

THE DIFFERENCE IN SIGMA VALUE OF THE DISTRIBUTIONS OF CERTAIN LANGUAGE AND RACIAL GROUPS IN AN ASTC ON FOUR VERBAL SUBTESTS OF THE WECHSLER MENTAL ABILITY SCALE, FORM B, DIVIDED BY THE S. E. OF THAT DIFFERENCE

<i>Subtest</i>	<i>Group</i>	$\frac{D}{S.E.D}$	<i>Chances in 100 of a True Difference</i>
Information*	White vs. Filipino	1.80	96
Arithmetic*	Filipino vs.		
	1) Mexican	6.07	100
	2) Colored	6.00	100
	3) White	5.96	100
	4) Indian	5.96	100
	5) Chinese	4.10	100
Similarities*	Colored vs.		
	1) Indian	4.69	100
	2) Chinese	2.18	99
Comprehension*	Colored vs. Mexican	3.12	100
Arithmetic vs.			
1) Similarities	Filipino†	4.12	100
2) Similarities	White†	2.83	100
3) Similarities	Colored†	3.57	100
4) Comprehension	Filipino†	4.12	100
Information vs.			
1) Similarities	Indian†	4.14	100
2) Similarities	Filipino†	2.80	100
3) Comprehension	Filipino†	2.80	100
4) Comprehension	Chinese†	2.25	99
5) Comprehension	White†	4.48	100
6) Comprehension	Colored†	5.14	100
7) Arithmetic	Colored†	3.14	100
8) Arithmetic	Mexican†	4.21	100
9) Arithmetic	Indian†	3.36	100
Comprehension vs.			
1) Similarities	White†	4.90	100
2) Similarities	Colored†	5.58	100

* Same subtests, different groups.

† Same groups, different subtests.

would hold, of course, for the sigmas of such standard scores which have been demonstrated not to have equivalent meaning, even though equal in absolute size. For these reasons not too much is to be gained by comparing the sigmas

of the same racial group on differing subtests. Nevertheless there does appear to be a little evidence that the dispersion of Information scores is less than for other tests while the converse is true to a lesser degree for Arithmetic.

GENERAL DISCUSSION OF FINDINGS

Four bi-lingual groups, the American Indian, the Mexican, the Filipino and the Chinese, and two groups who speak only English, the *White* and the Colored, were subjects of the present study. It may rather definitely be inferred from the data presented that a personally administered test of general capacity, such as the Wechsler Mental Ability Scale, Form B, does not necessarily lose in validity when used with bi-linguals who have more or less of a handicap in English. It must be remembered that validity is here defined as the association value of the subtest in question with the disposition of the trainee, whether discharged as inapt or retained in the Army. From the standpoint of that criterion, bi-lingualism does not appear to attenuate the efficiency of a personally administered verbal test. One must bear in mind, however, that the subjects studied are certainly not representative of the general population but rather of a segment in its lower extreme.

All of the trainees come to the Special Training Center through the operation of a standardized screening process. The bulk of the trainees in this study came to the Center through making a passing score on a performance test, called Visual Classification, at an Induction Station. Since the range of acceptable scores on this test was rather narrow, it may be inferred that most of them had quite similar abilities, so far as such abilities are measured on a performance test.

If it is granted that the trainee's abilities are roughly the same, as measured on the Visual Classification test, one must assume that bi-lingualism does tend to depress the score on a test administered verbally in English. The four bi-lingual groups were generally inferior on all four subtests to the White and Colored groups who spoke only English. It seems therefore, that while a verbal test may not lose in validity for bi-lingual groups, it may be unfair in that bilinguals earn lower scores than they obtain on performance tests.

Of all the bi-lingual groups, the American Indian is the most affected in this study by decrement in his verbal aptitude scores, as compared with his performance ones. The average score earned on the four subtests of the Wechsler by the Indian who is graduated and shipped is exactly equal to that earned by the bulk of all of the trainees who are discharged as inapt. Despite this decrement in average score, the Wechsler is still quite valid for him. With most of the Indians their low scores may, in part, be ascribed to their slowness in response and their apparent hesitancy to commit themselves on a question unless they are reasonably sure they know the answer. Retardation and hesitancy appeared to be the especial hallmarks of the Indian who came from reservations in Arizona, whence the majority of them did come. It is doubtless possible to obtain a relatively true psychometric on the Indian; it is estimated that to do so would require at least two and perhaps three times the labor required for a Colored soldier. It would not be worth the candle to do so, however, for the test is valid for the Indian if his aptitude score is compared with those of other Indians.

It should be mentioned in this connection that the Indian's score on the group placement tests was also lower than those of other groups among the trainees. Both types of tests are unfair to him in a degree, for, while his rate of discharge for inaptiness is somewhat greater than for other groups, the rate is

not in proportion to his decrement on the individual and group tests. From the standpoint of prediction, it is wise to obtain separate norms for the Indian. This is also true of the other bi-lingual groups to an extent, but, barring the Mexican, they are not numerous enough to warrant the labor.

The question may arise: Would performance tests give better results for bilinguals? From data in another study (1), it appears not. For those trainees who understood enough English to take the test in that language, the verbal subtests of the Wechsler were superior to the performance tests. A more recent study (unpublished) indicates that the Digit Symbol (Wechsler) subtest may have more validity for English-speaking trainees, however, than the previous study would lead one to believe. In any event, the validity coefficients of the Wechsler verbal subtests have been shown to be sufficiently high for the bilinguals, especially in predicting from the extremes of the distributions.

One caution in interpreting psychometric data in a Special Training Center cannot be too strongly urged: Feeble-mindedness should very seldom be inferred from test data alone. This caveat is especially important for the bi-lingual, and, except for extreme cases, it is also true of those born to the American culture and language. Literally hundreds of trainees have successfully completed the course in this Center, even though by all psychometric criteria they should have been feeble-minded. Their work record prior to entering the Army and their record at the Center showed such a position to be false. The final criterion of feeble-mindedness must be social.

The data presented in this study may raise the question of innate racial differences. It should be remarked that nothing at all is proved by the data herein presented, either for or against such differences. The men come from environments too divergent in language, customs, socio-economic status and psychological climate for one to accept the psychometric data at face value. One other factor, previously unmentioned, is that the percentage of trainees of a given race or group has not been equated to the percentage of such a group in the general population. Further, their differential rates of failure to attain the minimum standards at an Induction Station have not been taken into account. Thus it is clear that the data, *per se*, prove nothing regarding the long-standing question of racial differences in general aptitude.

The question may well be asked: What is the purpose in giving a general aptitude test in a Special Training Center? One reason is that if an almost completely illiterate trainee arrives who also scores quite low on the Wechsler, he is almost certain of discharge. Actuarial tables for prediction have been set up on the basis of each test used in the Center and of several in combination. Below a certain point on several tests (of which one is general aptitude), it is possible to say that the trainee has no chance whatever. At the other end of the aptitude scale, if a trainee is found to be quite apt but is almost completely illiterate, he is referred to a special reading section which specializes in such cases, so that the greater potentialities of this individual will not be lost to the Army. If a trainee has a certain degree of literacy on arrival and also has a general aptitude score above a certain level, he is sure to graduate from this Center.

Another use of the general aptitude test is as a check on malingering. The inter-relationships of all the individual and group tests administered to the incoming trainee have been computed, so that it is fairly easy to determine from the completed psychometric profile when malingering has been attempted. In such cases—they are relatively few—the trainee is called down for re-interview and re-test.

Still another use of the general aptitude test is that it furnishes an official

basis for evaluating the learning aptitude of the trainee in case it is necessary to write a statement in certificate form for the guidance of the board which determines whether a trainee will be discharged as inapt. This is only one bit of psychometric data among many which are included in the certificate, of course.

It must be admitted that a general aptitude test such as the Wechsler Mental Ability Scale, Form B, does not have the validity for predicting the disposition of a trainee that certain other tests in use at the Center have. The test of oral reading ability, the group test of computational efficiency in arithmetical functions and finally the Army test used for placing trainees in their respective levels for instructional purposes are all superior in predicting the set criterion to the Wechsler. However, the Wechsler has certain advantages, previously enumerated, which these other more valid (in this Center) tests do not have. The Wechsler is particularly valid in a team of tests.

A number of differences in the predictability of racial and linguistic sub-groups in this Center have been shown. The Negro and the Indian are the most easily predictable, while the trainee of Mexican ancestry is the least predictable. The Negro knows only one language; almost invariably the Indian is bi-lingual. No ready inference may be drawn as to why these two particular sub-groups should be the most predictable in an Army Special Training Center.

It should be of interest for such an experiment as recorded in this study to be duplicated in the public schools or colleges of America in order to determine whether the results here obtained could be substantiated. The only difficulty with such an experimental check-up is that of obtaining for all the groups an objective criterion such as is possible in this Center. The differential grading systems current in the various school systems probably preclude, for some time to come, any hope of obtaining a criterion which would be common to the several schools where such racial and linguistic groups could be found.

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BOOK REVIEWS

CANTRIL, HADLEY & RESEARCH ASSOCIATES. *Gauging public opinion*. Princeton: Princeton Univ. Press, 1944. Pp. xiv + 318.

For two reasons, this book must be regarded as an important addition to the scientific literature. In the first place it represents the first systematic overview of a device which, in little more than a decade, has become as familiar to newspaper readers as the "IQ" and as commonly misunderstood. Secondly, since the book is mainly a discussion of methodology, and because the method in question is one that overlaps those used in other areas of social science research, the points discussed have a far wider field of reference than a literal interpretation of the title leads one to expect. Although the experimental data reported are drawn entirely from public opinion surveys, in few if any instances do the numerous tables and graphs serve any other purpose than that of illustrating basic methodological principles, which for the most part, are not specific to research on public opinion. They apply equally to the construction of questionnaires or rating scales, to the measurement of attitudes and interests, to the conduct of interviews and the training of interviewers, and to all problems in which the results are likely to be affected by errors of sampling. This obviously includes a large proportion of modern investigations in such fields as psychology, sociology, economics and education, and to a less extent, biology, agriculture, medicine and public health.

The book is divided into five parts totalling seventeen chapters, together with seven appendices in which various technical aspects of the methods and principles described in the body of the text are explained in greater detail. Part I, *Problems involved in setting the issues* deals especially with the formulation of questions. Common pitfalls into which the inexperienced investigator is all too likely to stumble both with regard to the selection of suitable issues for study and the wording of questions about these issues are pointed out. Although many of the points raised have been noted by other workers, the context in which the facts are presented lends fresh emphasis even to well-seasoned principles. The series of experiments on the effect of changing the form of questions or of using a differently worded series of alternative answers to the same question are illuminating demonstrations of the tremendous importance of semantics.

Part II deals with the interview itself. The five chapters have to do with the advantages of secret vs. non-secret ballots, the dependability of interviewers' ratings, the amount of bias introduced by refusals to cooperate, the failure of the interviewer to secure adequate rapport with those interviewed, and a biased attitude toward the point at issue on his own part. Whether or not the additional expense of using only interviewers especially trained for their work is repaid by the greater accuracy of results is another question of decidedly practical import which was put to experimental test. Unfortunately, because it was not found possible to balance other characteristics of the group of trained workers with those of the group without special training, the results of this study were not entirely conclusive. They suggest, however, that if written instructions are sufficiently clear and explicit and the interviewers are intelligent and interested in their assignments, specialized training may be less essential than many have supposed. The experiment on the secret ballot provides rather clear evidence that marked bias may result from dependence upon openly expressed statements when the matter is one that might be expected to affect an individu-

al's prestige or that has definite personal or social significance. Although these findings are quite in line with what might be expected, they afford one more example of the hazards of a too literal interpretation of statements made over their own signature by persons who are intelligent enough to realize the implications of the questions asked. The studies on the effect of bias on the part of the interviewer are admittedly exploratory rather than final but they pose some exceedingly crucial problems which merit further inquiry. It is shown that interviewer bias can have so great an effect upon the results of a survey that the conclusions drawn from it may be exactly the reverse of those which would have resulted had the interviewers held a contrary bias. For example, in securing opinions on certain racial questions, even when the persons interviewed were all of the same race (in this case, Negroes) marked differences appeared in the proportions holding (or claiming to hold) certain opinions as reported by Negro and white interviewers respectively. In response to the question "Would Negroes be treated better or worse here if the Japanese conquered the U. S. A.?" only 25 per cent of the respondents questioned by the Negro interviewers believed that they would be treated *worse* while 45 per cent of those interviewed by white persons expressed this opinion. Nine per cent of those interviewed by Negroes and 2 per cent of those interviewed by whites believed that they would be treated *better* and 32 per cent of the former and 20 per cent of the latter believed that there would be no change. Very similar results were obtained when the word *Nazis* was substituted for *Japs*. When the racial issue was presented in more covert terms as in the question, "Do you think it more important to concentrate on beating the Axis or to make democracy work better here at home?", the differences in the returns obtained by Negro and white interviewers were equally pronounced. The amount of bias shown in the returns of experienced interviewers was almost identical with that of beginners, indicating that the differentiating factor was not a matter of practice in interviewing. The data do not enable one to judge whether the differences reported result mainly from:

- a. better rapport between the participants in the interview,
- b. differential selection of subjects in terms of known or presumptive opinions conforming with those of the interviewer,
- c. the numerous but hard-to-define variations in tonal inflection, facial expression and general manner of putting the questions that may prejudice their meaning and implications quite as much as actual changes in wording.

The authors are of the opinion that careful selection of interviewers in such a way as to secure approximately equal percentages of those likely to be biased in contrary directions or, failing that, by making a statistical correction for bias through differential weighting, the difficulty may be largely if not completely overcome. In Appendix II a statistical justification for the recommended practice of arbitrarily using an equal number of interviewers favoring and not favoring an issue is offered. The authors are careful to point out that the rule does not hold in those cases where lack of rapport as a result of recognized social or racial differences rather than examiner bias *per se* is responsible for the discrepancies. However, since it is not always easy to know where interviewer bias leaves off and lack of rapport begins, and since the differences between interviewer's results which were actually found in the experiments designed to test these factors were far greater than those used as examples in the theoretical illustrations given, the practice of using equal numbers of *pros* and *cons* can perhaps be more readily justified on practical than on theoretical grounds. The conclusion reached in the short chapter on *Refusals as a Source of Bias* that "it is extremely doubtful that the bias introduced into poll results by the refusal of some people

to be interviewed can compare in size with the bias resulting from the tendency of interviewers to select their respondents in an unrandom fashion, or the bias introduced by the divergence of respondents' answers from their true opinions" (123) is conservative and accords well with the evidence presented in this chapter and in the preceding one on interviewer bias.

Part III which consists of three chapters on problems of sampling is one of the most concise presentations of the importance of securing an adequate and representative sample, of errors resulting from biased sampling, and of methods by which errors of sampling may be avoided or minimized that it has been my pleasure to read. The advantages of the well selected small sample over the poorly chosen large sample are convincingly set forth. However the authors are careful to point out certain inherent limitations and hazards of the small sample which many of its enthusiastic protagonists are likely to overlook. Their statement (171) that "small samples are highly unlikely to represent opinion faithfully unless opinion is fairly uniform throughout an area and within different interest groups and unless such differences can be adjusted for in constructing the sample" should serve as a timely caution to those who advocate the unmodified application of the methods of agricultural statistics to the study of human behavior, forgetting that human beings are more variable than beans.

Section IV deals with methods of ascertaining the determinants of opinion. The first chapter describes the general method of the *break-down* by classifying the results according to known attributes of the respondents, such as place of residence, age, sex, economic status and so on. The two following chapters illustrate the procedure by showing how opinions vary in accordance with education, economic status and information about the topic in question. Changing trends of opinion are also shown to provide valuable leads regarding the origin of opinions when these trends can be aligned with changes in current affairs or specific propaganda.

The final section can best be described as a case study in the measurement of opinion. The problem set is that of measuring changing trends in civilian morale during the period between Nov. 19, 1941 and Mar. 26, 1942. The rationale of the questionnaire used and the analysis of the results leading up to a factor analysis to determine the dimensions of morale, are outlined briefly and some interesting data on group differences in morale are presented. In the seven appendices which deal with various technical and statistical problems and procedures, perhaps the most interesting to the research worker have to do with the correction for interviewer bias and the estimation of confidence levels. The charts on pp. 298-300 for use in making these estimates can be read with sufficient accuracy for most practical purposes. The bibliography of research articles on the use of public opinion polls appearing during the period 1936-1943 (Appendix VII) is probably the most comprehensive that has been published in this specialized field.

FLORENCE L. GOODENOUGH.

University of Minnesota.

MALINOWSKI, B. *A scientific theory of culture and other essays*. Chapel Hill: Univ. North Carolina Press, 1944. Pp. ix + 228.

According to Huntington Cairns, who saw the manuscript through the press after the death of Malinowski in 1942, this volume represents a summing up and a reformulation of Malinowski's functional theory of culture.

Just as Angell in 1907 regarded mental processes as means by which the organism adapts itself to its environment in the satisfaction of biological needs, so

Malinowski regards culture as the means by which organisms adapt themselves to the environment (much of which is itself cultural) in the satisfaction of needs. For Malinowski these needs may be *basic*, as in the case of what psychologists often call tissue needs, or *derived*, in which case the needs arise from the culture itself. These derived needs have the same stringency as the basic drives; in fact they are actually *biological*, in that "they are always instrumentally related to the wants of the organism" (124). "Every cultural achievement that implies the use of artifacts and symbolism is an instrumental enhancement of human anatomy and refers directly or indirectly to the satisfaction of a bodily need" (171). A cultural activity, whether it is a technological development, an institution, or an economic or social change, may create a need for itself, but this derived need is always related to one of the fundamental tissue needs; no culture survives in the absence of such a need.

Malinowski refuses to take diffusionism or the historical schools in anthropology seriously; he has no use for *museum collectors*. All that is necessary in determining the origin of institutions and artifacts is to discover the relationships between the environmental circumstances, the patterns of behavior, and the needs of the organisms concerned, taking into account the processes by which both organisms and environment are modified. This is not to deny that the general principle of evolutionary analysis is sound; in studying technological development, for instance, the analysis may be applied to the Stone Age, the Bronze Age, etc.

Let us, for a moment, face the imaginary situation of the birth of culture. I maintain that from our knowledge of modern stimulus-response psychology, of animal training, of infant psychology, as well as ethnographic evidence, we can reconstruct not the exact moment and form in which culture was born, but certainly the conditions necessary and sufficient for the transformation of animal into cultural behavior (133).

Despite the close similarity between functionalism in psychology and Malinowski's functionalism in anthropology, it is the "behaviorists" in psychology to whom Malinowski turns for guidance, mentioning specifically Hull, Thorndike and Liddell.

The value of behaviorism is due, first and foremost, to the fact that its methods are identical as regards limitations and advantages with those of anthropological field-work. In dealing with people of a different culture, it is always dangerous to use the short-circuiting of "empathy," which usually amounts to guessing as to what the other person might have thought or felt. The fundamental principle of the field-worker, as well as of the behaviorist, is that ideas, emotions and conations never continue to lead a cryptic, hidden existence within the unexplorable depths of the mind, conscious or unconscious. All sound, that is, experimental psychology can deal only with observations of overt behavior, although it may be useful to relate such observations to the shorthand of introspective interpretation (23).

Some of us may be reminded that F. H. Allport, writing as a behaviorist in the late 1920's, took particular pains to specify the ways in which the methods and techniques of cultural anthropology and ethnology differed from the methods and techniques of natural science in general and from those of behavioristic psychology in particular.

Some psychologists will note a curious inconsistency in all of this. Why should a functionalist in anthropology turn to the behaviorists in psychology? One suspects that Hull loomed large on Malinowski's horizon at Yale, while Angell was merely the president emeritus. There is no mention of Dewey or Ladd or Carr, or of anyone who could be classed as a functionalist outside of

anthropology, with the possible exception of Spencer and Darwin. Nor is there any mention of any of the numerous *cultural determinists* among the psychologists, who so often quote Malinowski. Perhaps Malinowski, who was often regarded as a *psychologists' anthropologist*, whatever else he may have been, looked upon the *cultural determinists* among the psychologists as merely his imitators, and therefore not dependable as psychologists.

The answer to these speculations may be that Malinowski never really came to grips with the problem of how it is that culture is derived from *animal behavior*, nor how it is that culture derives its needs. Be that as it may, a principle such as G. W. Allport's functional autonomy of motives might have provided a solution for the problem which would have been relatively more consistent with Malinowski's general approach.

A considerable portion of the volume is devoted to criticism and appreciation of the works of Sir James Frazer. Lacking the requisite background in anthropology, the reviewer hesitates to evaluate that discussion; the same may be said regarding the treatment of the concrete isolates of organized behavior, which should prove to be of interest to social psychologists.

Due perhaps to the circumstances under which the manuscript was written and published, the volume is somewhat repetitious. In general, it is thought provoking and stimulating, though not rigorous in its approach. Its chief value seems to be that it has stated succinctly a doctrine which has been incipient in many of Malinowski's writings, especially in introductions he has written for other people's books, but which until now has not been formulated between any two covers. The general doctrine is not new to those who are familiar with the older functionalism in psychology, but many of the anthropological corollaries will be of value to psychologists who are interested in cultural and institutional behavior.

ARTHUR JENNESS.

University of Nebraska.

SMITH, MAY. *The handbook of industrial psychology*. New York: Philosophical Library, 1944. Pp. 304.

With a few striking exceptions, books on industrial psychology have until recently overemphasized sensory psychology and the psychology of individual differences at the expense of social psychology. This volume clearly belongs in that older tradition, in spite of the fact that some space is devoted to discussions of attitudes, personality, and worker relations.

In her preface, May Smith says: "This little book is not intended to be a detailed chronicle of psychology from the industrial standpoint, but to provide an introduction to the subject for those who are in some way responsible for others, or who have to get on with others." Yet, even as an introduction, it leaves much to be desired. It does not give the impression that industrial psychology has concerned itself with very significant problems, nor that it has learned anything conclusive about insignificant ones. There is no doubt that the most crucial and least well understood problems of our industrial economy are today human problems. As such, one would suppose that the industrial psychologist might have something to say about them, even in an introduction to the subject. The author has not shown this to be the case.

There are many shrewd observations, and a few profound psychological insights scattered throughout the volume. They are not, however, highlighted as conclusions from research data, nor as important principles. They are usually buried in otherwise trivial contexts, and the lay reader is more than likely to miss their significance entirely.

The author's detailed discussions of research studies concerning the effects of fatigue, illumination, voice, temperature, and hours of work upon efficiency and worker attitudes may interest the reader who is totally unfamiliar with industrial psychology or industrial engineering. However, even the industrialist unacquainted with psychological literature is today aware that hours and conditions of work do affect output. Moreover, the quantitative results cited, while exact, are not impressive. One easily gains the impression that a great many words are being used to bolster rather trivial and obvious conclusions.

The most disappointing features of this book are really suggested by its title. Like most handbooks, it provides a conglomeration of facts, but they are not organized in a way which makes them readily available to the individual who wants the answer to a question. There is not even an index. On the other hand, there is no underlying systematic theory of human behavior guiding either the organization of the material or the planning of the reported research. For example, a chapter on why we work lists causally eight motives ranging from *money to escape from one's thoughts*. The average reader could add ten more without stirring from his armchair. The chapter can hardly increase the understanding or the skill of "those who are in some way responsible for others, or who have to get on with others."

The industrial psychologist may be glad to discover that the footnotes to this volume provide a fairly complete list of the publications of the Industrial Health Research Board, and references to a number of other less well known British studies. He will be somewhat irritated by the author's complacent disregard of the voluminous American literature of industrial psychology. The Hawthorne Studies are briefly mentioned once. Except for references to F. W. Taylor, the Gilbreths, and Ralph Barnes, the reviewer found no further mention of American work. Nevertheless, the author discusses vocational guidance and employment selection, the industrial psychoneurotic, the counselling interview, grievances, labor turnover, and safety!

A number of subjects are treated with what seems to this reviewer to be startling naiveté, even admitting the considerably greater maturity of British over American labor relations. With reference to foremen, the author says: "Here the responsible person has a limited field, but he is becoming more important with the present-day developments of industry." In discussing wages, she comments: "Prior to the war, relatively little was heard about the difficulty of estimating wages. The Trade Unions and Employers' Federations or Trade Boards came to agreements, and revisions could take place." (Incidentally this quotation includes the only mention of labor unions in the entire book.) She says that "much of the best information" concerning grievances "has been obtained incidentally to other work. Occasionally as a consequence of serious trouble, specific interviews have been held in order to find out the cause." These are, to be sure, isolated comments taken out of context. However, they are typical examples of the extent of the author's interest in problems that loom large on the American scene. One is led to the conclusion either that the author has led a remarkably sheltered life, or that the British Isles are indeed a lovely haven of industrial peace.

To this reviewer it seems unfortunate that another book should be added to the considerable quantity of superficial literature in the field of industrial psychology. Too many sincerely interested laymen will read at least part of it, and then lay it down with the conviction that the psychologist, after all, has not yet dared to come to grips with the realities of the industrial world.

DOUGLAS McGREGOR.

Massachusetts Institute of Technology.

TROYER, M. E., & PACE, C. R. *Evaluation in teacher education*. Washington: American Council on Education, 1944. Pp. xii + 368.

While this book is mainly a contribution to the literature on the development of programs for the selection and education of teachers, psychologists will be particularly interested in the tests and evaluative instruments, and in the implications of the practices for selection and training of workers in related fields. The authors describe present practice, mostly in institutions enrolled in the cooperative study; reveal some of the hazards involved in evaluating; and offer a critical appraisal of some of the current attempts to evaluate. For convenience they group current practice under seven headings: selection, orientation and guidance, general education, professional education, student teaching, follow-up studies, and in-service activities. Each division has important implications for colleges revising their curricula.

No doubt the authors will receive most disagreement from psychologists on what to them is their major contribution—student self-appraisal. They see self-appraisal as different from the interpretation of tests to the student by the expert and believe it to be more democratic and more motivating. They claim that the reliability of both attainment tests and attitude tests will be increased because of the increased honesty with which students will answer when they are to interpret the results themselves. Little objective evidence is offered to substantiate these claims. They realize that some students may not be "ready" to learn their test scores, but they define readiness only in a very general way as level of maturity, background of experience, emotional stability (88). These definitions are so vague as to be of little use to the person who wishes to know when a student is ready.

Psychologists will be interested in the relatively new testing and evaluating devices such as the case study of Mickey Murphy for testing understanding of child psychology; a scale of beliefs for measuring social attitudes; a student log of activities; a personality and speech rating scale for gaining estimates of personality through speech; and a planning paper for clarifying student goals. Other psychologists will want to take note of the technique of democratic evaluation that is replacing autocratic supervision in schools, in colleges and in the field. This parallels the industrial trend in foreman training. The authors have taken a pioneering step toward seeing the teacher selection and education program as a whole when they describe testing laboratory, the orientation program, and self-analysis as leading to clinics in reading, writing and speech, and when they show how strengths and how weaknesses revealed by teachers in the field might work back to improve the training program.

By no means the least contribution is the illustration by the study itself of how research may become a working part of a training program when it is carried on by those who are to use its results.

One weakness in the book from the psychologist's point of view should not be attributed to the authors. It comes from the absence of sound investigations in the schools and colleges. No institution seems to have carried on a thorough evaluation program from a research point of view. This handicap is most evident in the lack of objective evidence regarding the value of the instruments. The validity and usefulness of these devices depends on their discriminating power and on the extent to which they increase learning. But institutions should at least be given credit for starting to evaluate.

The whole field of evaluation and selection in education would be improved if success were defined in other than ambiguous and contradictory terms (16);

if the instruments that seek to measure the intangibles were checked more carefully as to validity and reliability as suggested by the authors (166-167); if earlier work in psychology were digested and brought to bear on the new study; if the most important problems could be cooperatively defined and studied by several institutions; and if the research could be more systematic in its attack on the myriad of problems involved.

Nonetheless, by providing opportunity for those responsible for the selection, training and appointment of teachers to work on the problem, the American Council on Education through its specialists has exerted tremendous influence on these colleges and on others who will use the new suggestions and insights.

GEORGE E. SCHLESSER.

Colgate University.

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NOTES AND NEWS

ROBERT P. HINSHAW, instructor in psychology, University of Illinois, has been appointed assistant professor of psychology at Pomona College, starting in September, 1945.

THEODORE A. JACKSON, formerly of the University of Delaware and Columbia University, accepted a position as Chief Consulting Psychologist in the Montreal Office of Stevenson and Kellogg, Ltd., Management Engineers. His present address is 970 Sun Life Building, Montreal, Quebec.

MARGARET R. KUENNE, formerly of the staff of the Western State Psychiatric Hospital (Pittsburgh), has been appointed instructor in the Institute of Child Welfare of the University of Minnesota.

KATHARINE M. MAURER, formerly instructor in the Institute of Child Welfare, University of Minnesota, has been appointed associate professor in the department of home economics, University of Nebraska, to conduct a research program in the area of rural family life.

PAUL MURPHY, acting head of the department of psychology, has been appointed dean of administration, at Kansas State College (Pittsburgh).

WILLIAM H. PYLE, professor of educational psychology, Wayne University (Detroit), has been appointed dean of the Graduate School.

MARION J. RADKE, formerly research associate in the Iowa Child Welfare Research Station, is now a member of the staff of the Research Center for Group Dynamics of the Massachusetts Institute of Technology.

SAMUEL N. STEVENS, president, Grinnell (Iowa) College, has been appointed personnel consultant for Pillsbury Mills, Inc., Minneapolis 2. Dr. Stevens will "consult regularly with John Neufeld, recently appointed director of personnel relations . . . on personnel problems and policies affecting office and sales employees of the . . . company."

WILLIAM R. THOMPSON, formerly psychology instructor at Purdue, has resigned to become assistant professor at the University of Florida.

BRIAN EARLE TOMLINSON, associate professor of education, New York University, will succeed **CHARLES E. BENSON**, professor of education, as chairman of the department of psychology, School of Education, upon Dr. Benson's retirement, August 31, after twenty years of service in that post.

WILBUR D. WEST, head of the department of psychology, Wittenberg College (Springfield, Ohio), was recently appointed director of the Western Michigan College of Education Camp (Clear Lake) and assumed his new duties, February 1.

Smith College, Northampton, Mass., announces the following promotions: **ANNELIES A. ROSE** and **ELSA M. SIPOLA** from assistant to associate professors of psychology; **LOUISE B. HEATHERS** from instructor to assistant professor of psychology, and **ESTHER LEE MIRMOW** from teaching fellow to instructor in psychology.

JOSEPH E. MOORE has been appointed head of the department of psychology and director of the Guidance Unit at the Georgia School of Technology (Atlanta). Dr. Moore has been serving as a Captain in the Adjutant General's Department and was Personnel Consultant, Headquarters, Fourth Service Command. Prior to entering service, he was professor of psychology at George Peabody College, Nashville, Tenn. The Veterans Guidance Center at Georgia Tech has been in operation since November, 1944. Dr. Moore is now working out an arrangement whereby psychological interns may receive clinical experience in the Unit. Inquiries as to these openings should be addressed to him.

In a further expansion of its service to the secondary schools of the state through teacher placement and help on rural education, Purdue University has made three appointments in its division of education and applied psychology: JAMES R. MITCHELL, formerly principal of the Richmond Senior High School becomes assistant professor in charge of teacher placement; PAUL ALEXANDER, formerly principal of Greensburg High School has been named assistant professor and advisor on rural education; and ESTON J. ASHER, formerly associate professor of psychology at the University of Kentucky, becomes associate professor in charge of the psychology laboratory.

A panel of three speakers discussed *Contributions of Psychology to the Rehabilitation of Veterans* at the monthly meeting of the Chicago Psychological Club at Northwestern University, March 2. HELEN S. SCHACTER, Chief Clinical Psychologist, Veterans' Rehabilitation Center, commented on *Contributions of Psychology to Therapy*; RALPH W. TYLER discussed *Contributions in Educational Situations*; and AGNES A. SHARP discussed *Contributions in Industrial Situations*.

In 1943 the National Research Council under the Division of Biology and Agriculture established a Committee on the Biological Process of Ageing. This Committee which has been inactive because of war conditions is now prepared to consider the possibility of financing carefully thought out research projects in this area. With the increasing life span of the population, the problem of ageing becomes of greater and greater importance and numerous psychological problems present themselves for careful and sustained research programs. Information concerning any psychological research now under way or seriously contemplated in this area should be sent to W. S. HUNTER, Brown University, Providence, R. I., who is the psychological member of the committee.

Reprints of *Psychology and the Post-War World* which appeared in the December, 1944, *Psychological Bulletin*, may be obtained from the American Psychological Association Business Office, Northwestern University, Evanston, Illinois. The cost of the reprints is 20 cents each, or 15 cents in quantities of 100 or more. Community organizations and colleges concerned with demobilization and rehabilitation will be particularly interested in this symposium.

Because of the limitations on the uses of paper and the necessity of conserving space, the *Psychological Bulletin* will henceforth use a smaller size of type in its main articles than has been customary in the past. This will permit publication of substantially the same amount of material in a smaller number of pages.

